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ABSTRACT

This report presents existing workforce levels, training programs and career potentials and develops staffing level projections (1976-1982) based on available information for the State of Mississippi. The study concerns itself with the environmental pollution control areas of air, noise, potable water, pesticides, radiation, solid waste, wastewater, and energy. The format includes workforce profiles, projections, growth and career options for each of the areas investigated. Additional sections of the report outline state legislation and selected post secondary institutions with formal Environmental/Energy programs. A state profile and summary is included for cross-reference. The selected bibliography is appended in the Region IV report. This document is one in a series of 69 which presents information for each of the states, Washington, D.C., Puerto Rico, and the Virgin Islands, and national and regional summaries. (CS)

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MISSISSIPPI

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NATIONAL ENVIRONMENTAL/ENERGY

WORKFORCE ASSESSMENT

for

MISSISSIPPI

Conducted by:

NATIONAL FIELD RESEARCH CENTER, INC

Under Grant from:

UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

Grant #T900591010

1977

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INTRODUCTORY NOTE

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PREFACE

This report presents existing workforce levels, training programs, and career potentials and develops staffing level projections (1976-1981) based upon available information for the State of Mississippi in the environmental pollution control areas of air, noise, potable water, pesticides, radiation, solid waste, waste water, and energy. This study was carried out for the United States Environmental Protection Agency by National Field Research Center of Iowa City, Iowa.

The information and data presented in this report were compiled in large part from extensive interviews with professionals working in the respective areas and were supplemented by telephone surveys and research.

FOREWORD

The material herein contains the information and data collected for eight individual pollution control inventories conducted for Mississippi. The format includes workforce profiles, projections, growth and career potential for each of the areas investigated. Growth projections are necessarily best professional estimates developed from available information and represent what are felt to be realistic figures by experts in the respective areas. The pollution areas considered by this study are as follows:

Air

Noise

Pesticides

Potable Water

Radiation

Solid Waste

Waste Water

Energy

National Environmental Energy Workforce Assessment

Phase I

MISSISSIPPI

State Summary

I. AIR

The Mississippi Air and Water Pollution Control Commission is responsible for the state's air pollution control program. Approximately 54 person-years of effort in the Commission is expended toward air pollution control, divided nearly equally among engineers, scientists, technicians, and clerical and administrative employees. Future workforce needs are not expected to be dramatic; an approximate annual growth rate of 4% is projected.

According to sources, most industries either use out-of-state corporate engineering staffs for air pollution control or hire private consultants. It is estimated that there are 25-40 persons in the private sector servicing the field, 10 of whom are consultants. Additional laboratory and testing personnel will be required in the private sector. The number of those in air pollution control in industries is also expected to increase over the next five years, but at a lower rate. Based upon available information, by 1982 there will be from 15 to 20 consultants in the field, consisting of engineers, scientists and laboratory technicians, and there may be as many as 60 persons in industries servicing the field on a part-time basis.

Training voids for the Commission's air pollution personnel are being dealt with by a regional training committee that was established by Region IV EPA. Training needs still exist, however, especially with regard to ambient monitoring.

II. NOISE

Efforts to locate activities within the State of Mississippi in the area of environmental noise control have not been successful. A Federal-State Coordinator in the Governor's office had been identified as the contact person for environmental noise. However, this person has left the post in that office and, currently, no new contact person has been identified. State sources in other pollution control fields are unaware of any efforts to implement environmental noise legislation. The Assistant Attorney General for Environmental Affairs has indicated that subcommittees relating to noise have not been formed within the Mississippi General Assembly. Further, a national survey of municipal noise ordinances prepared by Dr. Clifford R. Bragdon, and published in Sound and Vibration, December, 1976, reports that only the City of Jackson has a noise ordinance, a nuisarce regulation which does not include acoustical criteria.

III. PESTICIDES

The Division of Plant Industry of the Mississippi Department of Agriculture and Commerce is the certifying agency for all except aerial applicators, and dealers, and is responsible for the pesticide registration program. The Agricultural Aviation Board certifies aerial applicators and the State Chemical Laboratory performs chemical and microbiological analyses for enforcement purposes. Within these agencies, approximately 49 persons are engaged in pesticide-related activities, most on a part-time basis, and include chemists, biologists, and persons from many facets of the agricultural field.

The Cooperative Extension Service of Mississippi State University provides training to commercial applicators, and utilizes nine extension specialists, most on a part-time basis. Private applicators are trained by 82 county agents.

In addition to the above, U.S. EPA Region IV operates a Pesticide Product Analysis Section in Bay St. Louis. The Section employs eight persons.

One additional entomologist per year will be required in the Division of Plant Industry and the State Laboratory may require staffing increases. No increases are projected for the other state agencies although the EPA Laboratory expects to add five positions in the next five years.

State sources estimate that 93,547 private applicators, 2,839 commercial applicators and 1,500 dealers will require certification by October 21, 1977, with an estimate 5% per annum growth thereafter.

IV. POTABLE WATER

The Mississippi Safe Drinking Water Act was passed in 1976, and is designed to allow the state to assume primacy for the Federal Safe Drinking Water Act. The Division of Water Supply is responsible for the state's drinking water program and support is received from the Department's Bureau of Local Health Services and Bureau of Public Health Laboratories. There are currently 150 persons providing services on a full- or part-time basis, including 11 engineers, 126 local health sanitarians, 10 scientists and 3 clerical personnel. Workforce growth will not be dramatic, according to sources, chiefly because of state budget limitations. Seven to eight engineers may be added during the next five years, along with a lawyer, an enforcement officer, two chemists and three secretaries.

The state coordinates a voluntary certification program for operators of water treatment plants. There are currently 153 licenses issued to operators, in four classifications. With 1,300 water supplies in the state, officials estimate that there are 1,200 uncertified persons operating water treatment plants. Sources estimate that by 1982 there will be 500 certified operators, although the total number of operators is not expected to increase.

The Mississippi Water and Pollution Control Operators Association sponsors week-long courses twice yearly for water and wastewater plant officials. While a small market exists at the present for institutional training programs in the field, the demand is expected to become greater in the future.

V. RADIATION

The State Board of Health is in charge of administering Mississippi's statewide radiation protection program. The Board's Division of Radiological Health has chief responsibility for the program and coordinates four programs: Environmental and Emergency Response Plan Development, X-Ray, Radioactive Materials and Non-Ionizing Radiation. The Division employs one director, two secretaries, one chemist and six health physicists. Within five years it is anticipated that five additional positions will be gained, for four health physicists, and several technicians. Monitoring around nuclear facilities will be started during 1977, and officials hope that local health department sanitarians can be utilized for collecting samples.

Data indicate that there may be one or two health physicists and eight to ten technicians for radiation control in nuclear facilities in the state. Three or four consulting firms offer radiation control services, which employ health physicists and radiation physicists. Workforces in nuclear facilities will increase as reactors commence operating. The number of consulting firms is expected to increase to nine or ten by 1982.

In sum, career opportunities should be available for health physicists and health physics technicians in both the public and private sectors. Radiation physicists and chemists should also be in demand.

VI. SOLID WASTE

The Mississippi State Board of Health is responsible for the state's solid waste management program, and will implement the provisions of the Federal Resource Conservation and Recovery Act of 1976. The Board's Division of Solid Waste has responsibility for the program and is assisted by 125 county sanitarians of the Board's Bureau of Local Health Services. The Division consists of one director, four sanitarians and one engineer. Officials preliminarily forecast that at least four additional personnel will be required to implement the new Act: an attorney, a chemist, a sanitarian and a secretary.

Sources estimate that 67 landfill operators and 67 spotters are employed in the state's landfills. A total of 1,111 persons are also estimated to work in solid waste management, including approximately 977 in collection. There is one hazardous waste disposal site in the state, staffed with two persons. Within five years the numbers of operators and spotters are expected to increase to approximately 87 each, and the total number employed is expected to be approximately 1,456. The number of persons staffing hazardous waste disposal sites is expected to increase to 16. The future of resource recovery in the state hinges upon the future markets for recovered materials.

VII. WASTE WATER

The Mississippi Air and Water Pollution Control Commission is responsible for the state's water pollution control program. In the Commission, 78 persons work full- or part-time in water pollution control. However, 68 person-years are spent in wastewater, chiefly engineers scientists and technicians. Officials do not anticipate that significant growth will take place within five years, beyond several additional engineers unless currently-unforeseen changes in strategy occur from the federal level. Also strict state budget limitations are in effect. The state has assumed NPDES permitting authority.

The state operates a voluntary operator certification program. There are 244 certificates issued to wastewater treatment plant operators. The total number of operators is estimated by officals to be 1,300. Administrators project that the number of certified operators will double in the next five years due to the move toward certification on the part of operators and to the construction, expansion and upgrading of plants.

The Mississippi Water and Pollution Control Operators Association offers two short courses annually for operators. The Commission also offers one-day and three-day upgrade workshop study sessions for operators. If the attractiveness of operator jobs improves and salaries increase, greater demand will occur for institutional operator curricula, although officials doubt their practicality at this time.

VIII. ENERGY

The Mississippi Fuel and Energy Management Commission has responsibility for the state energy program. The office is mainly involved in petroleum allocation, and has no direct activity in the area of pollution control, except as environmental regulations impact energy production activities. Efforts will soon be focused in the area of energy conservation since this agency will be the recipient of a grant stemming from the Energy Policy and Conservation Act of 1976 (EPCA).

The Commission currently has a staff of two. As task forces and advisory committees will be utilized to a large degree for implementing EPCA, an increase in the Commission's staffing level is not anticipated by officials.

One provision of EPCA provides for mandatory thermal efficiency standards and insulation requirements for new and renovated buildings. This will require highly trained architects, scientists and engineers with skills in building design, product development and efficient heating and cooling techniques.

STATE OF MISSISSIPPI - SUMMARY

National Environmental/Energy Workforce Assessment
Pollution Control & Abatement Personnel
Projected Workforce Requirements (1976-1981)

Environmental Area	1976	1977	1978	1979	1980	1981	%/annum growth (average)
AIR [1]	94	104	113	127	136	145	9%
NOISE [2]	0	0	0	0	0	0	0
PESTICIDES [3]	140	141	143	144	146	147	1%
POTABLE WATER [4]	303	379	451	528	599	664	17%
RADIATION [5]	10	12	14	16	16	16	11%
SOLID WASTE [6]	1,244	1,317	1,386	1,455	1,524	1,593	5%
WASTEWATER [7]	312	368	425	482	539	595	14%
ENERGY [8]	2	2	2	2	2	2	0
TOTALS	2,105	2,323	2,534	2,754	2,962	3,162	9%

[1] Includes the state agency (1976=54; 1981=65) and estimates of the private sector.

[2] No noise control persons have been identified. Sources indicate that chances for development of a state noise control program within five years are limited.

[3] Includes the state agencies and coutny extension. Not included are an estimated 93,547 private applicators, 2,839 commercial applicators and 1,500 dealers. The growth rate for commercial applicators and dealers is projected at 5% annually.

[4] Includes the state agency (1976=150; 1981=164) and certified water treatment plant operators.

[5] Includes the state agency. The number of consulting firms offering services in the field is expected to increase within 5 years. Requirements will also increase in the nuclear industry.

[6] Includes state agency personnel (1976=133; 1981=137) and estimate of the work-force involved in solid waste collection and disposal.

[7] Includes the state agency (1976=68; 1981=70) and certified wastewater treatment plant operators.

[8] Includes the state energy agency.

EDUCATION

Mississippi has two educational institutions that offer students environmental curricula in preparation for employment in an environmental capacity. Those institutions are Mississippi Valley State University in Itta Bena and the University of Southern Mississippi in Hattiesburg.

Mississippi Valley State University offers a B.S. degree in Environmental Health. Students receive training in the natural and physical sciences in addition to their environmental, health, and administration concentrations.

The University of Southern Mississippi provides one functioning B.A. or B.S. program in Environmental Technology. Other majors including 1) Environmental Health-Industrial Hygiene-Technology Emphasis, 2) Environmental Health-Sanitation Technology Emphasis, and 3) Industrial Technology Curriculum are limited in staffing and enrollment.

LEGISLATION

The environmental/energy legislation for Mississippi was obtained by request from various agency personnel and through various library references. Summaries of the legislation deemed most relevant to the eight subject areas of the workforce assessment were prepared, and are included in the respective state reports. The following list of laws represents virtually all environmental legislation for the state. Only certain of the following laws were summarized; the list is presented to show, by title, the kinds of laws which have been enacted.

Air and Water Pollution Control Law

Pest Control Law

Pesticide Application Act of 1975

Safe Drinking Water Act of 1976

Radiation Protection Act of 1976

Solid Waste Disposal Act of 1974

National Environmental Energy
Workforce Assessment

Phase I

MISSISSIPPI

State Report

STATE PROFILE

Mississippi has been called the "Stronghold of the Old South". With its 47,716 square miles, Mississippi is the 32nd largest state in the United States. The State's population in 1970 was approximately 2,324,000, of which 20.5 percent lived in metropolitan areas.

Mississippi's land slopes from hills in the northeast to the delta, a cotton-producing alluvial plain in the west and northwest, lying between the Yazoo River and the Mississippi River, which borders the State's western edge. The land also slopes to the south to the 44 miles of coastline along the Gulf of Mexico. Over 50 percent of Mississippi's land is classified as forests. The average annual temperature in the State is 65 degrees, while annual precipitation averages 49.5 inches.

Jackson is the largest city in Mississippi, and is also the State Capital. Other major cities include Biloxi, Meridian, Gulfport and Greenville. Until the last decade, Mississippi was one of the least industrialized states in the nation, with more than one-half of its population making a living from the soil. Recent programs of industrialization have attracted numerous manufacturing concerns.

Significant amounts of agricultural activity take place in the State, and important commodities include cotton, soybeans, pecans, sweet potatoes, sugar cane, hay, peanuts and corn. The State is also a chief producer of cattle, poultry and eggs.

Harvesting Mississippi's timber produces lumber products that include hardwood pulp wood and hardwood lumber and slashline products, including fiberwood, kraft paper and newsprint. The State's natural resources also

include petroleum and natural gas, which are being tapped and refined. Biloxi maintains a large seafood canning industry, operating deep-sea trawlers for shrimp and oysters.

Recent industrial expansion has been mainly in the fields of lumber, furniture and paper, food processing, apparel, chemicals, transportation equipment and machinery. In 1972, $982,126,500 was invested in new and expanded industry, creating 21,749 new jobs. Tourism has also been a growing industry in the State.

State economists forecast that Mississippi will grow faster in 1977 than will the rest of the nation. The major reason, they say, is that the per capita income, which is the lowest in the nation, is 32 percent behind the rest of the country, which is an attractive statistic for industries seeking low-cost labor. Also noted by forecasters is that in good economic periods, the State grows more than the rest of the nation, and in bad times its performance matches the rest of the nation. The State is coming out of the recent recession and is expanding its manufacturing base; new industries are moving into the State. The surge came after a lean 1975 when manufacturing employment dropped for the first time in 25 years. In 1976, the manufacturing employment again rose. State officials forecast that the current 5.8% unemployment rate will drop to 5% in 1977.

MISSISSIPPI POLLUTION CONTROL AND ABATEMENT AGENCIES

Environmental responsibilities are carried out in several State agencies in Mississippi. These agencies include the Board of Health, the Air and Water Pollution Control Commission, the Department of Agriculture and Commerce, the Cooperative Extension Service and the Fuel and Energy Management Commission.

Within the State Board of Health, the Bureau of Special Environmental Programs holds chief responsibilities for the State's radiation, potable water and solid waste programs. The Division of Radiological Health performs environmental radiation monitoring, conducts an X-ray regulatory registration program, issues licenses to users of all radioactive materials, and inspects sources of non-ionizing radiation. The Division of Water Supply will attempt to assume primary enforcement responsibilities for the Federal Safe Drinking Water Act. This Division also assists in the training of water treatment plant operators. Regulation of solid waste handling and management is carried out by the Division of Solid Wastes Management and Vector Control through a permitting process. Regulation of hazardous wastes will take place, and staffing levels are expected to increase as a result of the recent passage of the Federal Resource Conservation and Recovery Act.

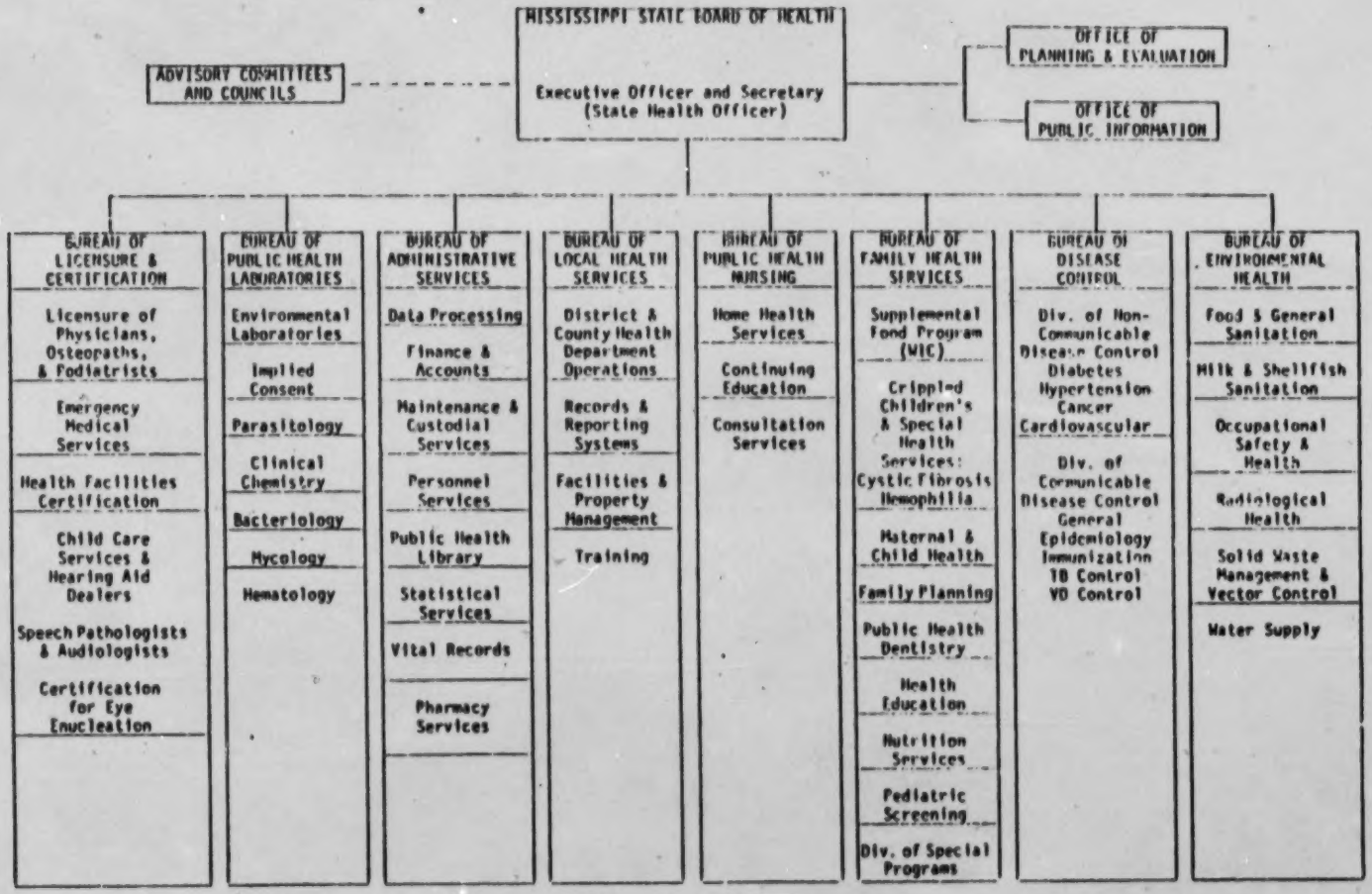
Also in the Board of Health, the Bureau of Local Health Services services environmental fields through its 125 sanitarians located throughout the State. These sanitarians perform monitoring and sampling of water supplies, and monitoring of landfills in cooperation with the Bureau of Special Environmental Programs. In addition, five laboratories of the Bureau of Public Health Laboratories perform water supply analyses.

The Mississippi Air and Water Pollution Control Commission is responsible for the State's air and water pollution control programs. Air quality control is carried out by a permitting system. An emissions inventory system is operated, as well as an ambient monitoring network. An NPDES permitting program is carried out for wastewater control, as well as special studies and planning efforts, and a wastewater treatment plant operator training program.

The Division of Plant Industry of the Mississippi Department of Agriculture and Commerce is the certifying agency for all except aerial pesticide applicators, and is responsible for the pesticide registration program. The Agricultural Aviation Board is responsible for the certification of aerial applicators, while the Cooperative Extension Service conducts training programs for pesticide applicators.

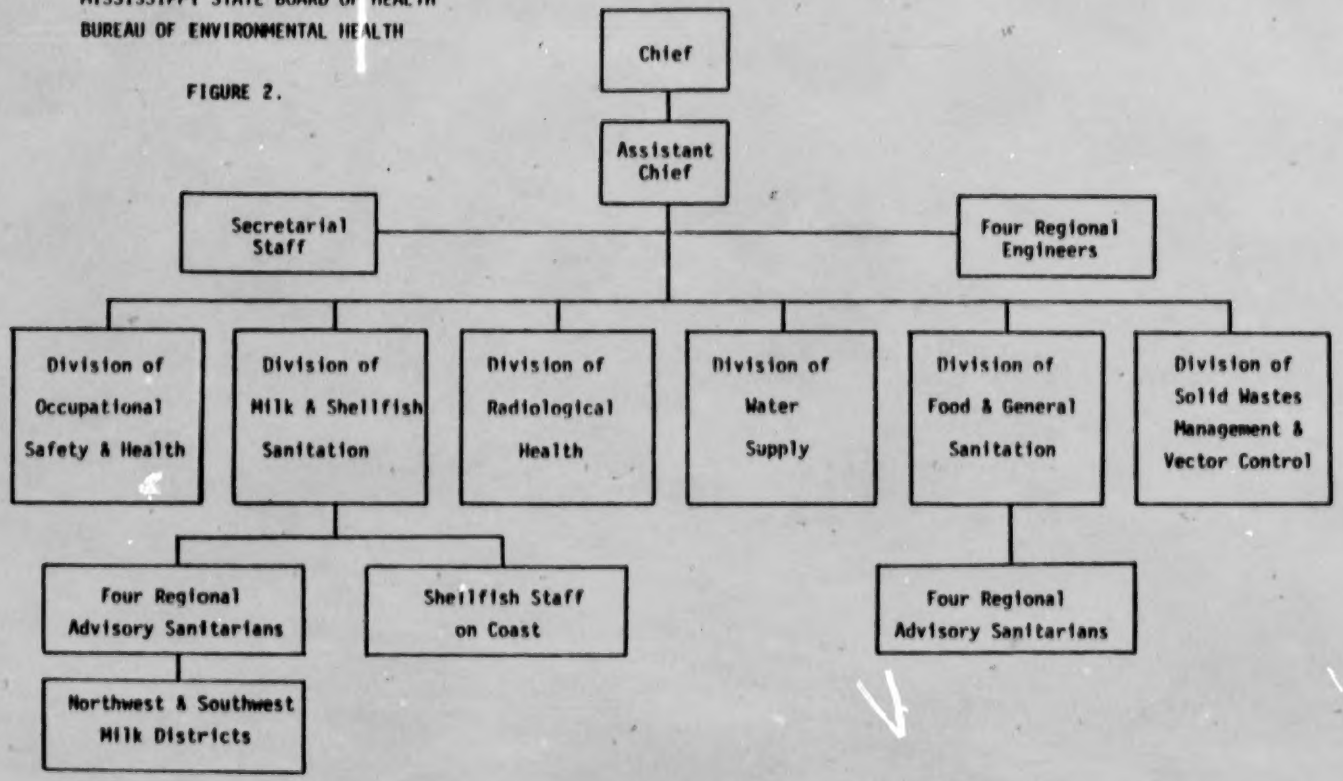
Mississippi's State agency that has chief energy concerns is the Fuel and Energy Management Commission. This office has mainly been involved in petroleum allocation, but will become involved in implementing an energy conservation program stemming from the Federal Energy Policy and Conservation Act.

FIGURE 1. MISSISSIPPI STATE BOARD OF HEALTH
ORGANIZATIONAL CHART



MISSISSIPPI STATE BOARD OF HEALTH
BUREAU OF ENVIRONMENTAL HEALTH

FIGURE 2.


Chief
Assistant Chief
Secretarial Staff
Four Regional Engineers
Division of Occupational Safety & Health
Division of Milk & Shellfish Sanitation
Division of Radiological Health
Division of Water Supply
Division of Food & General Sanitation
Division of Solid Wastes Management & Vector Control
Four Regional Advisory Sanitarians
Shellfish Staff on Coast
Four Regional Advisory Sanitarians
Northwest & Southwest Milk Districts

Pollution Control and Abatement Programs

I. AIR

A. Introduction

Mississippi's Air and Water Pollution Control Act was enacted in 1968 and amended in 1973 to conform with federal air and water pollution control laws. The Act created the Mississippi Air and Water Pollution Control Commission, composed of ten members representing various State agencies, local government, industry and agriculture. The Commission appointed an executive director, and a staff was formed to implement the purposes of the Act.

The Act declares it unlawful for any person to cause pollution of the air in the State, to place substances in a location where they are likely to cause pollution, or to discharge any substances into the air which reduce the quality of the air below standards set by the Commission. It is also declared unlawful for any person to build, erect, alter, replace, use or operate any equipment which will cause the issuance of air contaminants unless having received a permit, except for repairs or maintenance of equipment for which a permit has previously been issued. A Permit Board is established by the Act for reviewing applications for and issuing, modifying, revoking, or denying permits required by the Act. This Board is composed of five members, all from State agencies.

State sources indicate that the law is comprehensive, and allows the Commission the needed flexibility for adequate enforcement. Especially with regard to stationary sources, the Act closely models the federal Clean Air Act. However, the State legislation does not allow for control of indirect sources. This may be dealt with by the legislature in the near future.

Staff administrators of the Commission and representatives of the Attorney General's office, which represents the Commission on legal matters, have

noticed that in recent years, the State legislature, the courts and the general public are becoming more environmentally conscious, and have begun to exhibit a greater amount of support to the Commission. However, the attitude that environmental regulatory agencies prevent industrialization has not completely disappeared.

Within the Commission itself, until approximately one year ago the chief interest was in water pollution control, according to State sources. However, increased interest is occurring in the field of air pollution control, evidenced by the fact that a three-person sub-committee has recently been formed to identify new needs and areas of future involvement in air pollution control.

B. Workforce Profile

Chief responsibilities for the State air pollution control program are carried out by the Air Quality Control component of the Commission, although support is received from Field Services. Air Quality Control has two major Sections, Engineering, and Planning and Standards, the functions of which are as follows:

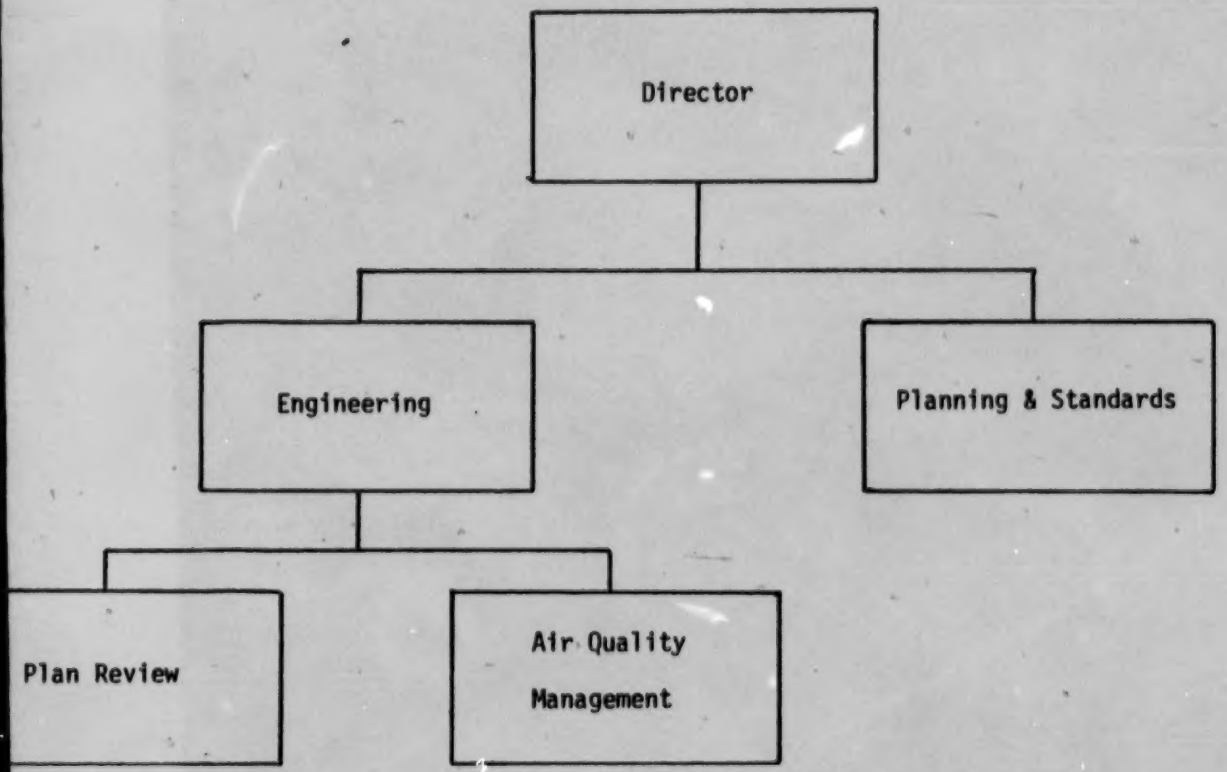
Engineering Section:

Plan Review Branch: Responsible for implementing the permit system. Performs pre-construction review, and investigations of operating equipment. Permits must be renewed every three years.

Air Quality Management Branch: Established the emissions inventory system for ascertaining the air quality impact of new sources. Concentrates efforts in the four non-attainment counties.

Planning and Standards Section: Responsible for the ambient monitoring network, and for special studies, centered around ambient monitoring. Identifies the origin and distribution of particulates.

Field services are coordinated by a separate Commission component, overseen by a regional coordinator. Three regional offices are in operation, in



MISSISSIPPI AIR AND WATER POLLUTION CONTROL COMMISSION

Air Quality Control

FIGURE 3.

Oxford, Ocean Springs and Jackson. These offices support both the air and water programs, and personnel perform monitoring, maintenance of monitoring equipment, and inspections of facilities. Responsible for approximately 97% of all inspections that are performed by the Commission, these persons gather data in support of enforcement. Manual and continuous monitoring are performed by regional personnel at 29 sites throughout the State.

The Commission operates a wet chemistry laboratory in Hattiesburg that performs tests mainly for sulfur dioxide. Two to three special analyses are performed each year.

There is no specific enforcement branch for the Commission. Investigations are performed, but only the Board itself can cause a notice to be filed. Staff currently issue "notices of apparent violation."

During 1976, 53.5 persons were budgeted to air quality control work in the Commission, 39 of whom worked full time in the field. The remaining 14.5 represent person-years, for those in administration and support positions, that service both air and water. The total effort, 53.5 person-years is broken down as follows: 13 engineers, 23.5 pollution control technologists, 2.5 chemists, 4 clerical and 10.5 administration employees. Ten of these pollution control technologists service the air program through the regional offices, 2.5 chemists do so in the laboratory, while the remainder work in the main office in Jackson.

Ten engineers have bachelor-level degrees, while three have master's degrees. Preferred by Air Quality Control administrators are chemical engineers, followed by mechanical or ex-aerospace engineers, and third, industrial engineers. At the present time, engineers are roughly one-half chemical and one-half mechanical, although also employed are an electrical, an industrial and an environmental engineer.

Pollution Control Technologists (PCT's) range from levels II through IV. PCT II's require two years of college work in a technically-related area, while PCT III's must have a bachelor's degree in a technically-related field. The program administrators search for majors in chemistry, biology, and environmental sciences to fill these positions. Those with a bachelor's degree and six years of experience, or a master's degree with four years of experience, may advance to become PCT IV's, who usually supervise regional offices.

Vacant positions are filled through the State's Classification Commission. Air administrators choose the persons to fill the vacancies, after which time it takes four to six weeks to actually fill the positions. To find qualified personnel, administrators perform on-campus interviews, call employment agencies, or as a last resort, put ads in newspapers. The Commission has anticipated forming a personnel office, as these procedures are time-consuming and an initial screening process is needed.

Engineering positions are most difficult to fill because of the higher salaries of industries and the federal government, and the supply for these types of people is not as great as the demand. Pollution Control Technologists are readily available, as many local colleges and universities are offering degrees in biology and chemistry.

The following table depicts the total number of personnel engaged in air quality control activities in the Mississippi Air and Water Pollution Control Commission, in person-years. As pollution control technologists are both degreed and non-degreed, these persons are reflected both in the categories of "scientist" and "technician". The specific breakdowns, however, are approximations, but according to available information, approximately one-half have bachelor-level degrees.

TABLE I

MISSISSIPPI AIR AND WATER POLLUTION CONTROL COMMISSION

Air Pollution Control
Current (1976) Staffing Level

Position	1976**
Engineer	13.0
Scientist	13.5
Technician	12.5
Other*	14.5
TOTAL	53.5

* Includes clerical and administrative support
** Person--years.

During 1976, Mississippi contained 333 major installations, or facilities capable of emitting over 100 tons of pollutants each year. This represents approximately 7% of all major installations in Region IV. On June 30, 1976, 237 of these were in compliance with respect to emission limits and/or compliance schedules 78 were not, and the status of 18 was unknown.

According to State professionals, larger industries in Mississippi, such as E.I. duPont de Nemours and Company, Standard Oil Corporation and General Electric Corporation retain their own engineering staffs at corporate headquarters offices, not located in Mississippi. Medium-sized industries, such as the larger wood manufacturers, generally hire private consultants to deal with air pollution problems, although some do retain some technical capability on their own staffs. The smaller industries, mainly the 467 cotton gins in the State, rarely have personnel on staff that understand air pollution control requirements. In these cases, the State personnel perform services in a consultant-type capacity, explaining regulations, offering advice, and directing attention to other similar companies that have successfully met standards.

According to State sources, there are three consulting firms in the State that offer services in the field of air pollution control. These firms have

expertise in the area of emissions testing, but have very little knowledge of control equipment design. Therefore, these firms perform testing functions and subcontract to out-of-state firms for equipment design.

Within these three consulting firms are ten professionals servicing the air pollution control field. These people are roughly one-half engineers and one-half scientists, according to State sources. While some larger and medium-size plants do retain persons at least part-time for air pollution control equipment maintenance and testing, according to available information it appears that at the present time the number of personnel in the public sector exceeds the number in the private sector for those engaged in air pollution control. It appears a reasonable estimate that 25-40 persons in the private sector currently service the field in the State, most on a part-time basis, consisting of engineers, scientists and technician/maintenance personnel.

C. Workforce Projections

The State air pollution control program has undergone dramatic growth in recent years, and is now focusing on maintenance of existing programs. Future workforce needs, therefore, are not expected by administrators to be dramatic. For Fiscal Year 1977, administrators have requested four new positions, for two engineers and two technologists. These positions were requested one year ago and were not granted because the State cannot constitutionally spend additional monies. Therefore, these positions may not be granted during Fiscal Year 1977, but if not, the Commission will continue to apply for these positions annually. The engineers are required for the Air Quality Management Branch in anticipation of new source reviews. The technologists will be added to the ambient monitoring group for quality assurance in the calibration of equipment, to review data gathering methods and to assist in the development of accurate recording and reporting systems.

By Fiscal Year 1979, Air Quality Control would like to add two engineers to conduct special projects oriented toward ascertaining the types of regulations required to control particular types of pollutants and to develop cost-effective methods. Focus will be in the development of methods of controlling pollution from farming activities. Also special studies will be performed regarding sulfate and sulfur dioxide problems potentially arising in the Mississippi delta area, where five power plants will be converting to coal.

An additional four engineers will be required in the next five years for the Air Quality Management Branch for plan review in the construction of new facilities. In addition, a statistical analyst will be required within several years for the ambient monitoring program, mainly for projecting air quality levels from available statistical data in the counties that are not being monitored.

Additional positions to be requested are due mainly to the federal requirements in the areas of new source review and significant deterioration. Efforts in these areas are already being carried out, but more detail will be required. In addition, increased workloads will be caused by the high rate of industrial expansion in the State.

Engineers have typically exhibited a high turnover rate, because of the higher pay scales offered in industry and the federal government. Recently, however, the State introduced an incentive program for engineers, whereby raises are given twice per year. According to administrators, the turnover rate dropped but has begun to rise, presumably because of rumors that this program will be discontinued. Technologists have also typically demonstrated a high turnover rate, and it is estimated that 80% have been replaced since 1971. This trend is somewhat reversing, attributed in part to the

current employment market and state of the enonomy. Turnover for clerical employees is estimated at 5% annually, and no turnover has existed for higher level administrators and chemists in recent years.

The following table depicts future workforce levels for air quality control within the Mississippi Air and Water Pollution Control Commission, as projected by administrators, again depicted in person-years:

TABLE II

MISSISSIPPI AIR AND WATER POLLUTION CONTROL COMMISSION

Air Pollution Control
Workforce Projections to 1982 (est.)*

Position	1976	1977	1978	1979	1980	1981	% annum turnover (average)	%/annum growth (average)
Engineer	13.0	15.0	16.0	19.0	20.0	21.0	13%	10%
Scientist	13.5	13.5	13.5	15.5	15.5	15.5	12%	3%
Technician	12.5	12.5	12.5	12.5	12.5	12.5	13%	0
Other	14.5	14.5	14.5	15.5	15.5	15.5	4%	1%
TOTAL	53.5	55.5	56.5	62.5	63.5	64.5	11%	4%

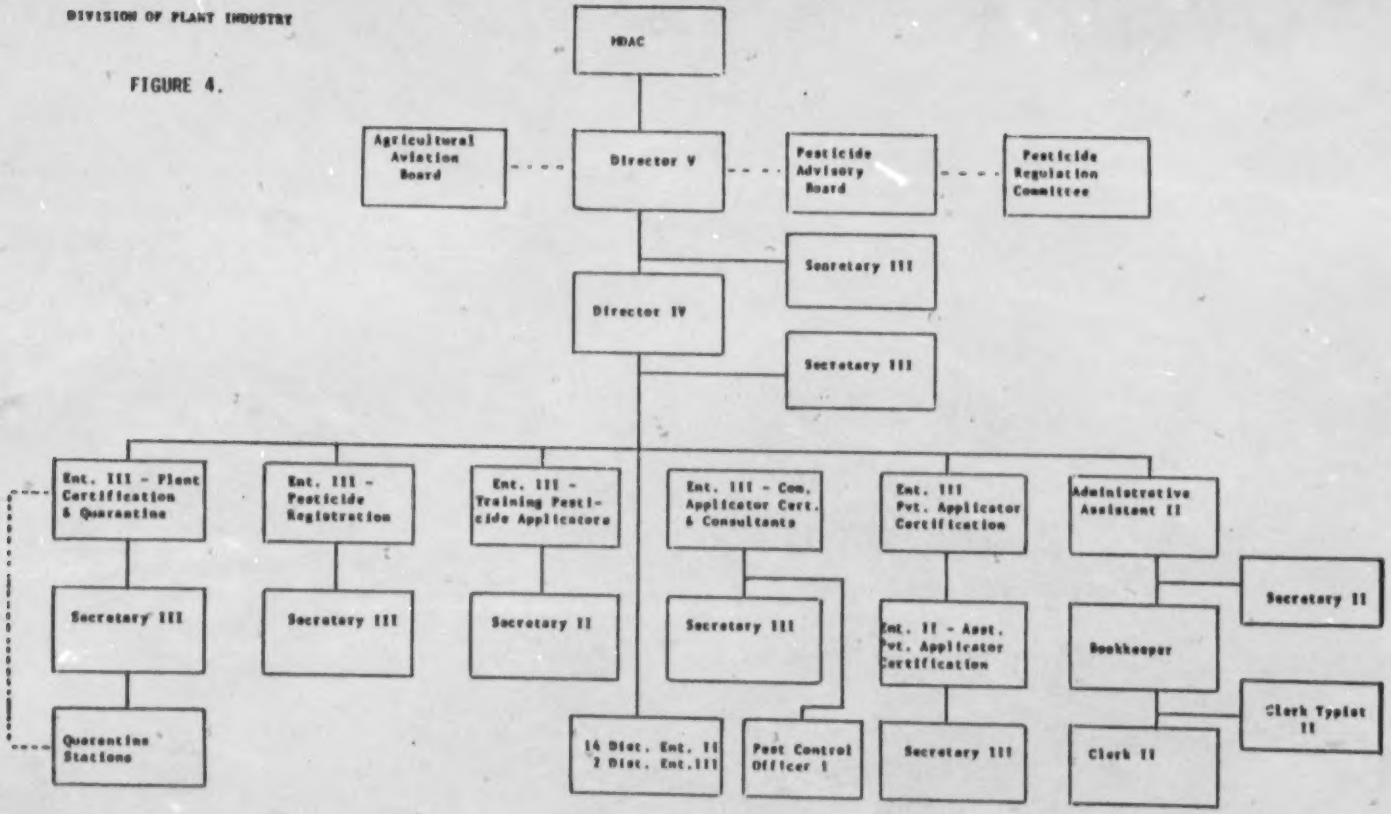
*Person--years.

Approximately 23% of all major installations had not yet met standards as of June 30, 1976 and the status of approximately 5% was unknown. It appears that additional workforce efforts might be needed in the industrial sector to meet compliance schedules and emission limits. However, according to State sources, the majority of these major industries utilize persons from out-of-state corporate offices for dealing with pollution control matters. The major workforce impact, then, will not be within the State.

If the State becomes more deeply involved in the assessment of air quality impact of new source construction, air pollution control consultants would be in greater demand for conducting analyses. Another factor that could cause an increased need for consultants is if additional categories beyond the present nineteen are utilized for testing of significant deterioration.

DIVISION OF PLANT INDUSTRY

FIGURE 4.



Industries are currently required to test emissions every three years. The State anticipates requiring two more tests over a three year period, which would require more testing and laboratory personnel, probably in private firms. Finally, Mississippi has four non-attainment counties, two of which will probably require changes in allowable limitations, to become more restrictive. This would require additional engineering capability for the design of complex equipment. Mississippi consulting firms presently do not have this capability, however, and unless this expertise is acquired within the State, these matters would be dealt with by out-of-state corporate headquarters engineering staffs or by out-of-state private consulting firms.

With the increasing number of industries in the State and the anticipation of more stringent regulations, described above, it is estimated by State professionals that the number of persons providing testing and analytical work for industries in private firms may increase fifteen to twenty percent annually during the next five years. Room for growth is already exhibited by the fact that those currently offering these services are working at full capacity. The number of those engaged in air pollution control in the State within industries themselves is not expected to increase at this rate, but rather at approximately five to ten percent annually, mainly due to the increasing industrialization in the State. Based upon the available information, there may be from fifteen to twenty consultants in the private sector engaged in air pollution control, consisting of engineers, scientists and laboratory technicians, and there may be as many as sixty persons working in the field within industries, although the majority of these would be servicing the field on a part-time basis. In many cases, these persons would be technical and maintenance type personnel that would assure ongoing maintenance of equipment.

D. Training and Certification

All new professional employees in Air Quality Control receive approximately one week of introductory training through U.S. EPA cassette tapes. Following this period, new entrants are supervised by an experienced person for varying lengths of time. Field personnel are instructed by engineers, and accompany other inspectors for approximately one month.

Air pollution employees have attended EPA manpower development courses, but these proved too costly when tuition rates were imposed, and personnel no longer attend. Therefore, personnel participate in the Southeastern Air Pollution Control Training Committee that was recently formed by Region IV EPA. Mississippi personnel attended the course offered in October, 1976, in Tennessee on "Control of Particulate and Gaseous Emissions" and have expressed the feeling that this course was very successful. Professionals will also attend the course to be sponsored in Mississippi in the spring of 1977 on meteorology, diffusion, and math modeling. According to State personnel, a field enforcement course will be held in the summer of 1977 in South Carolina.

Training regarding ambient monitoring is not readily available, according to professionals, and the State air pollution personnel have contemplated organizing an in-house training session, but staff personnel are not completely familiar with all types of equipment. Instead, sales representatives of of equipment manufacturers are called upon to provide training, and several staff personnel attend related courses which are offered not more than once a year by the Surveillance and Analysis Division of U.S. EPA Region IV in Athens, Georgia. Universities in Mississippi are not offering short courses in ambient monitoring or any other facet of air pollution control at the present time.

Air Quality Control personnel offer a Visible Emissions School which is certified by the U.S. EPA. Two of these schools were offered to State personnel only, but these courses have since been opened to the general public.

E. Career Potential

The greatest number of new positions expected to be created at the State level will be for chemical or mechanical engineers. Those who have had coursework in air pollution control will receive priority, although this type person is not readily available. Only two positions for technologists are expected to be created, although with high turnover rates, opportunities should be available for engineers, scientists and technicians. Any applicant who has had previous course work and/or experience in the field of air pollution control would receive priority.

In the private sector, increasing needs are projected for engineers, scientists and technicians who are versed in any or all phases of ambient monitoring, data analysis and laboratory testing. The major efforts will probably continue to be carried out by private consulting firms. In addition, as expertise is not readily available in the State regarding equipment design, the market appears open for those highly skilled professionals with this type of capability.

F. Conclusion

Within the State, an increased interest is occurring in the legislature and in the general public in the field of air pollution control, at least partially due to the data gathered from the State's ambient monitoring network. With public support, the State's enforcement attempts are becoming increasingly fruitful.

Moderate workforce increases are expected at the State level in air pollution control, approximately four percent annually, due to the rapid industrialization continuing within the State, the anticipation of more stringent requirements, and the need for conducting additional special studies. Workforce increases in the private sector are anticipated, and opportunities will probably remain with private consulting firms that perform data gathering and analysis.

Training voids for State personnel are being dealt with by a regional training committee that was established by Region IV EPA. Training needs still exist, however, especially with regard to ambient monitoring. The availability of technical upgrade training is crucial to the State's regulatory program, as those with prior education in the field are not readily available because of the lack of air pollution control coursework offered by colleges and universities. This problem is magnified by the fact that State salaries are not competitive with those of private industries and the federal government, and most qualified professionals find no need to apply for jobs with the State.

II. NOISE

Efforts to locate activities within the State of Mississippi in the area of environmental noise control have not been successful. A Federal-State Coordinator in the Governor's office at one time had been identified as a contact person for environmental noise. However, this person has left the post in that office, and currently no new contact person has been identified. State sources in other pollution control fields are unaware of any efforts to implement environmental noise legislation, and the Assistant Attorney General for Environmental Affairs has indicated that subcommittees relating to noise have not been formed within the Mississippi General Assembly. Further, a national survey of municipal noise ordinances prepared by Dr. Clifford R. Bragdon, and published in Sound and Vibration, December, 1976, reports that only the City of Jackson has a noise ordinance, a nuisance regulation which does not include acoustical criteria.

III. PESTICIDES

A. Introduction

The Division of Plant Industry of the Mississippi Department of Agriculture and Commerce was designated by the Governor in 1972 as the lead agency for the regulation of the application and use of pesticides. Authority is granted by the following State Laws and Regulations:

A. Regulations of Professional Services-Mississippi Code 1972, Title 69, Chapter 19, Sections 69-19-1 through 64-19-11.

B. Regulation of Crop Spraying by Aircraft-Mississippi Code 1972, Title 69, Chapter 21, Article 1, Sections 69-21-1 through 69-21-27.

C. Agricultural Aviation Licensing Law of 1966-Mississippi Code 1972, Title 69, Chapter 21, Article 3, Sections 69-21-101 through 69-21-123.

D. Mississippi Pesticide Application Act of 1975-House Bill 262, Laws of Mississippi 1975, Chapter 318.

E. Mississippi Pesticide Law of 1975-House Bill 277, Laws of Mississippi 1975, Chapter 319.

The Division of Plant Industry, located at Mississippi State University, is the certifying agency for all except aerial applicators, and dealers, and is responsible for the pesticide registration program. The Division is set up in sections, one each for commercial applicator certification, private applicator certification, pesticide registration, and training. Enforcement and certification compliance are carried out within the sections.

The Mississippi Cooperative Extension Service of Mississippi State University is responsible for conducting the training program for commercial

and private applicators and dealers. Commercial training is carried out by extension specialists from Mississippi State University while private applicators are trained by the extension specialists and county agents in each county of the State.

The Agricultural Aviation Board of Mississippi is responsible for the certification of aerial applicators. The Board carries out the enforcement of the laws in relation of aerial applicators.

Chemical and microbiological analytical services are provided by the Mississippi State Chemical Laboratory for supporting enforcement activities. Within this body are a pesticides residue lab and a pesticide formulation lab. Also, within the biochemistry laboratory, special studies are performed under an EPA grant relating to the health effects of pesticides upon humans. This is called the Mississippi Epidemiological Studies Program, and has been funded since 1967. Past and present activities include air and blood monitoring for pesticides, and plans are underway for a correlation study regarding pesticide usage and cancer incidence in Mississippi.

The Division of Plant Industry has an official Advisory Board created under the provisions of Section 69-25-3 of the Mississippi Code, 1972. This Board meets quarterly and approves all regulations administered by the Division. The members of the Board are, the head of the Plant Pathology and Weed Science Department at Mississippi State University, the State Chemist, the head of the Mississippi State Chemical Laboratory, and the head of the Entolology Department at Mississippi State University.

Additionally, a Pesticide Advisory Committee is established that advises the Division of Plant Industry on matters pertaining to pesticides.

The Committee meets annually or more often, if necessary, and is composed of fifteen members, from both the private and the public sectors.

Finally, the Mississippi Pesticide Application Act provides for an advisory Committee appointed by the Commissioner of Agriculture and Commerce to include representatives from agriculture, agri-business, and related industries. The purpose of the committee is to advise and assist the Commissioner in developing regulations and plans for implementing the provisions of the Act and a pesticide regulatory program to meet the requirements of the federal Act, FIFRA. This Committee is composed of twenty-two members.

Under Mississippi law, all classifications of pesticides for restricted use by the Environmental Protection Agency (EPA) will automatically be adopted by the State. In order to use any restricted-use pesticide, an individual must either be under the direct supervision of a certified applicator or be certified himself/herself. EPA's ten categories are utilized, with the addition of an eleventh category, aerial application.

While the State pesticide program is felt by its own officials to be fulfilling the required functions as efficiently and as effectively as possible under the circumstances, it is felt that greater efficiency could be provided if the Federal Government would eliminate or cut down on the lengthy and complicated procedures and paperwork that are required. Applications and accounting procedures should be made as simple as possible, State officials feel, and laws and regulations should be written concisely. Providing training to State fiscal officers concerning the application for funds and accounting processes would be very useful.

At least for the next several years, no major changes are expected to take place in the programs of the Division of Plant Industry or in the cooperating agencies. Changes that might occur will be due to presently unforeseen new or revised federal requirements.

B. Workforce Profile

The Division of Plant Industries currently employs 35 employees: three executive, 15 administrative and clerical, and 17 technical employees who are strategically located throughout the State (see organizational chart). It is estimated that this entire staff spends approximately 60% of its time on pesticide-related duties. Other activities include bee and termite inspections, plant quarantining, and pink bollworm scouting. Both administrative and technical personnel come from the backgrounds of entomology, plant pathology, and agronomy.

The Cooperative Extension Service employs one full-time person for pesticide certification and training activities, and expects to hire another soon. In addition, seven or eight specialists assist in training when the needs arise. Approximately 82 county agents in the State (one in each county) have been trained by these Extension Service personnel to train private applicators.

Two investigators of the Agricultural Aviation Board are involved full time in pesticides activities. Duties include inspecting airplanes that are used for the application of pesticides, and licensing the applicators.

Within the State Chemical Laboratory, three chemists are employed in the formulation lab, while a fourth assists approximately half-time. The equivalent of three full-time chemists work in the residue laboratory at the present time. Within the biochemistry laboratory, the equivalent of five full-time personnel are employed for pesticide work, who are chemists and biochemists.

The following table depicts current staffing levels within the aforementioned agencies, and the current numbers of applicators and dealers certified (as of December, 1976):

TABLE III

MISSISSIPPI PESTICIDES PERSONNEL

Public and Private Sector
Current (1976) Staffing Level

Public Sector	1976
Division of Plant Industry[1]	35.0
Cooperative Extension Service[2]	91.0
Agricultural Aviation Board	2.0
State Chemistry Laboratory	11.5
Total	139.5
Private Sector	
Private Applicators	11,050
Commercial Applicators	2,156
Dealers	400
TOTAL	13,606

[1]Approximately 60% of time spent in pesticides

[2]At the Extension Service, only 2 of 9 work full time in pesticides. The total includes 82 county agents.

The Surveillance and Analysis Division of U.S. EPA Region IV operates a Pesticide Product Analysis Section in Bay St. Louis, Mississippi. This section currently employs eight persons: six chemists, one laboratory aide and one secretary.

C. Workforce Projections

If present EPA requirements do not alter appreciably, State officials feel that an increase will be required for field investigations in the Division of Plant Industry. Currently the bulk of time required for sample-taking is spent in preparing paperwork. Since an increase in the number of samples taken will take place, additional personnel will be needed, possibly one additional entomologist per year during the next five years.

After the anticipated increase of one person for pesticide training and certification in the Cooperative Extension Service that is to take place in 1977, it is not projected that additional personnel will be needed. The greatest need for training will be over near the end of 1977, after the October 21 deadline, after which time the chief concern will be in the continuation of existing training programs.

Likewise, staffing level growths will probably not be required for pesticide activities in the Agricultural Aviation Board or in the formulation lab of the State Chemistry Laboratory. A possible 50% staff increase will take place in the residue laboratory during the next five years, however, due to an increased concern of manufacturers to be in compliance with pesticide laws. Staff increases within the biochemistry laboratory for the pesticides program are not projected, but this is solely dependent upon future EPA funding levels.

The above projections are all based upon the best professional judgments of administrators in these agencies. Turnover rates were found to be quite low for professionals in these agencies, averaging approximately 6% annually. Reasons given include the present state of the economy, satisfaction with work and working conditions, and congeniality among employees.

Within the Pesticides Products Analysis Section of Region IV EPA, the addition of five new people in the next five years is anticipated. Additions would include three chemists and two technicians, required for analyzing the projected increase in samples.

In sum, within the public sector, approximately 13 new positions are expected to be created for pesticides-related work in the next five years. As projected, these will include five chemists, five entomologists, two laboratory technicians and one trainer from an unspecified agricultural discipline.

The number of certified private and commercial applicators will increase rapidly until October 21, 1977, the deadline for certification for those that apply restricted-use pesticides. The number of private applicators who may require certification in Mississippi is estimated by the Division of Plant Industry as follows:

Farmers:	93,000
Nurseries:	447
Timber Producers	50
Fish Bait Ranchers:	25
Bee Keepers:	25
Total	93,547

Following the 1977 deadline, it is estimated by professionals that the number of uncertified or "new" private applicators will be very low, although specific estimates have not been made. However, for commercial applicators, it is estimated that an approximate 5% annual growth rate will occur following the deadline. This figure includes turnover, which State personnel believe to be quite low.

The following table depicts the current number of certified commercial applicators and dealers (as of December, 1976) and the projected numbers to be certified yearly to 1982, as forecasted by professionals within the Division of Plant Industry.

TABLE IV
MISSISSIPPI PESTICIDES PERSONNEL
Private Sector
Workforce Projections to 1982 (est.)

	1976	1977	1978	1979	1980	1981
Private Applicators	11,050	93,547	*	*	*	*
Commercial Applicators	2,156	2,839	2,981	3,130	3,287	3,451
Dealers	400	1,500	1,575	1,654	1,737	1,824
TOTAL	13,606	97,886	4,556	4,784	5,024	5,275

*undetermined

D. Training and Certification

Upgrade opportunities for personnel within the Division of Plant Industry are limited, although personnel are encouraged to attend graduate school, though it must be at their own expense. Investigators do attend training for becoming certified.

This training, which is offered by the Cooperative Extension Service, covers all of the standards required for certification. Commercial operators are offered eight hours of training in the general standards, offered approximately twelve times per year. These are held at four centers in the State, and all sessions are taught by a team of three extension specialists, who utilize audio-visual aids, question-answer periods and group discussion. In order for a commerical applicator to prove competency in general standards, he/she must pass a test which includes the following areas: (a) label and labeling comprehension, (b) safety, (c) environment, (d) pest recognition, damage, biology, (e) pesticides, (f) pesticide application equipment, (g) application techniques, and (h) laws and regulations.

Specific standards for commercial applicators must be met for each category and/or subcategory for which an applicator wishes to be certified. Training for each category lasts one day, and the frequencey of training days varies within the categories and the numbers requiring training in the categories. Training for each category, however, is held at least once in each of the four districts.

A team approach is also used for specific standards training for commercial applicators. Extension Specialists from the disciplines of agronomy, agricultural engineering, plant pathology, entomology, community

development, and wildlife and fisheries are utilized. Again, applicators must demonstrate competency through an examination in order to become certified.

An examination is offered following each day of training. After passing both segments, certification is granted. The option is available, however, for a person to take the examinations without having attended the formal training, after having acquired and studied a self-instructional packet of materials.

Following October, 1977, a reduction in the number of available training days per year will take place. Core manual training will be reduced to two days per year, and category training to one day at one centralized location in the State. Recertification may be required of all commercial applicators, and training in all categories will be offered. Core manual training will not be required for recertification. A three- or five-year deadline for recertification will be imposed.

County agents, Extension Specialists, and district entomologists from the Division of Plant Industry have been trained in core and category standards for private application. Private applicators are trained, in turn, by county extension agents in all 82 counties with assistance from their staff and State supervisory personnel, if needed.

County-wide group meetings are held for training purposes, and audio-visual presentations are utilized. In order to become certified, the private applicator must demonstrate practical knowledge of pest problems and pest control practices associated with his/her agricultural operations, proper storage, use, handling, and disposal of pesticides and pesticide containers, and legal responsibility. Training sessions generally last

six hours, and examinations follow slide set presentations. Private applicators may, however, choose to take an examination without training, participate in programmed instruction with or without assistance, take an oral exam if the applicant is unable to read, or apply for single purchase certification for emergency use of pesticides.

The number of uncertified private applicators after October, 1977, is expected to be very low. However, some uncertified or "new" private applicators will require training for certification each year, which will be accomplished through one of three options available, namely, training, programmed instruction, and self-instruction and examination. Certified private applicators will require recertification every five years. This will be accomplished by attending two regularly-scheduled extension county training meetings during the five-year period. Once an individual is certified, an examination will not be required for recertification, but proof of attendance at the meetings will be kept by county agents, upon which issuance of certificates will be contingent.

Major changes in training materials or content are not anticipated by officials of the State Extension Service, for either private or commercial training. The numbers of sessions offered, however, will necessarily decrease as the number of applicators requiring certification decreases. The program has been running smoothly and effectively, and the major expenses have been made, namely providing audio visual machinery to county extension offices. Long-range possibilities include the widespread use of an auto-tutorial program for participants to teach themselves the required materials for certification.

Although training and certification plans for restricted use pesticide dealers are in an earlier stage of evolvement, presumably activities

will run along similar courses to those mentioned above, with the highest rate of activity taking place during 1977, with a subsequent decline during the following years.

E. Career Potential

Within the State agencies involved in pesticide registration, training and certification, it is not expected that new careers or areas of expertise will be required within the next five years. Rather, entomologists, plant pathologists, and agronomists will continue to prevail, with the latter two occupations possibly being utilized more frequently than they currently are, as the area of integrated pest management opens up. Chemists and biochemists will continue to be utilized in State laboratories, and chemists and laboratory technicians in the EPA Laboratory.

Within the private sector, also, State personnel do not anticipate the emergence of new types of careers. Applicators, however, will require a continual upgrading of skills as chemicals become more complex and regulations more stringent.

F. Conclusion

The future of the workforce levels and activities within Mississippi State pesticide programs is primarily contingent upon federal policies and mandates. Since these cannot be accurately predicted by State personnel at this time, State projections are based upon the assumption that present programs and policies will be maintained. Under this assumption, personnel needs are not expected to increase appreciably, and future activities will involve maintenance of programs, but at a lower level after 1977. A five percent annual growth rate is projected for certified commercial applicators.

Under existing Federal and State laws and regulations, new careers are not expected to emerge in the public or private sectors beyond an overall upgrading of skills through existing procedures. State sources indicate that training offered by State personnel to the private sector should be able to provide the quality and quantity of opportunities to meet the demands of the workforce.

IV. POTABLE WATER

A. Introduction

In 1976, the Mississippi legislature passed the Mississippi Safe Drinking Water Act, which was approved by the Governor. This legislation coincides closely with the Federal Safe Drinking Water Act, and is intended to allow the State to assume primary enforcement responsibilities for the implementation of the national drinking water standards. Regulations are currently being devised so that implementation will commence in 1977.

The Act charges the Mississippi State Board of Health to develop these regulations and to provide the needed enforcement mechanisms. The Director of the Board may authorize variances and exceptions, and when a contaminant is endangering the health of the public, may issue orders or commence civil actions against the appropriate water supplier.

Chief duties for program implementation of the Act are delegated to the Division of Water Supply of the Bureau of Environmental Health. Field services are provided by the Bureau of Local Health Services, and water supply laboratory testing is performed by the environmental laboratories of the Bureau of Public Health Laboratories.

Mississippi has abundant groundwater resources, and at the present time, only three surface water plants are in operation, in Columbus, Jackson and Meridian. In 1962, there were a total of 252 municipal water supplies in operation. As a result of the loan and grant program of the Farmer's Home Administration, 600-700 additional Community supplies became operable. The Board has identified approximately 1,400 water supplies totally in the State, most of which obtain their water from deep wells.

The State operates a voluntary water treatment plant operator certification program, which was begun in 1972 with the impetus of the Mississippi Water and Pollution Control Operators Association. The Chief of the Bureau of Environmental Health of the Board of Health serves as the chairman. Six operators also serve in the Association. The Board of Health is responsible for the preparation of examinations, and for administering and grading examinations.

A major obstacle that the Board of Health faces in ensuring that all citizens are provided with safe drinking water is the lack of citizen concern and awareness of possible drinking water dangers. For years, much of the public has been drinking water that was not properly chlorinated. Although drinking water has often not been bacteriologically safe, municipal officials inform the citizenry that no dangers actually exist. For this reason, Board officials feel that a cautious approach must be taken in the enforcement of the Act, and that a top priority must be to inform the citizens of the State as to the hazards of drinking bacteriologically-unsound water. Until public support received, enforcement attempts may prove fruitless.

B. Workforce Profile

The chief and assistant chief of the Bureau of Environmental Health are both engineers. The Division of Water Supply has seven full-time engineering positions, one of which has been vacant, one sanitarian (training) position and three clerical positions, two of which have been vacant. The engineers come from sanitary or environmental engineering programs. Two regional engineers also assist the Division in carrying out duties in relation to potable water.

Objectives of the program include the following:

1) To assure the availability of safe drinking water to the Mississippi public through the development of Rules and Regulations and the provisions of adequate enforcement machinery.

2) To provide information concerning State and Federal laws and hazards of unsafe drinking water to the public.

3) To provide training to water treatment plant and water distribution systems operators.

4) To promote the voluntary certification program.

The Bureau of Local Health Services employs 125 sanitarians in district and county health departments throughout the State. These sanitarians are required to be college graduates with at least eighteen hours of science courses. These people provide services in the areas of milk and shellfish sanitation, food and general sanitation, solid waste management and vector control and water supply. In relation to the latter program, the sanitarians perform monitoring of public supplies and perform water sampling. The also provide limited advisory services to clear new wells for use.

Within the Bureau of Public Health Laboratories, there are five environmental laboratories in the following locations: Jackson, Gulfport, Tupelo, Magnolia and Columbus. These labs perform analytical services for the milk and shellfish sanitation and the water supply programs. There are two persons in each laboratory, classified as Technologists II, the majority of whom are chemists. Some, however, have backgrounds in microbiology. All water sample analyses are performed in these laboratories.

Vacancies are filled through the State Personnel office, which maintains

a register listing qualified applicants. This office files a Request for Personnel Action with the State Budget Commission, which is reviewed and sent to the Governor for final approval. According to interviewed officials, this complicated procedure often causes lengthy delays, and positions often remain vacant for extended periods of time. Engineers are easily recruited, as salaries are competitive with other State agencies. Clerical employees, however, are offered very low wages, and vacancies are not easily filled. The Bureau of Local Health Services has difficulty recruiting sanitarians with adequate environmental knowledge, as this type of person is not readily available. In these Bureaus, recruitment is often carried out to supply names of qualified applicants to the Personnel office's register. The chief means is to visit universities in the State and interview prospective applicants in the appropriate departments.

The number of persons engaged in work relating to potable water on a full- or part-time basis at the State level appears in the following table.

TABLE V

MISSISSIPPI STATE BOARD OF HEALTH

Potable Water Program Operations
Current (1976) Staffing Level

Postion	1976
Engineer	11
Sanitarian	126
Scientist	10
Other	3
TOTAL	150

There are currently 153 licenses issued to water treatment plant operators in classifications "A", "B", "C", and "D", corresponding to the level of the plant which each person is operating. "A" plants provide water from

surface sources, serve a population of over 100,000 or use lime soda softening. "D" plants serve a population of under 10,000 and supply water from wells and pressure tanks. Administrators in the Bureau of Environmental Health estimate the number of certificates issued in the following manner, by grade:

Classification	Number of Certificates (est.)
A	10-15
B	10-15
C	45-50
D	60-70

With 1,300 water supplies in the State, officials further estimate that approximately 1,200 uncertified persons are operating water treatment plants. These persons typically have had little or no training in the field, and often a municipal meter-reader becomes the operator. Only the three surface water plants employ laboratory personnel.

C. Workforce Projections

The Bureau of Environmental Health would like to raise the number of regional engineers to five, and project that one might be added each year through 1979. In addition, discussion is underway regarding providing the regional engineers with sanitarians or technicians for assistance in their duties. No decisions have been reached as yet, but it appears that the budget will not allow for these additions.

Within the Division of Water Supply, administrators project that one additional engineer will be added each year during the next five years. In addition, a need for three additional clerical employees is projected. An enforcement officer will be added, hopefully by July 1, 1977, and administrators hope that a lawyer will be provided. Because of the low salaries,

clerical turnover has been fairly high. Turnover for engineers is less than 5%, however, attributed to the Board of Health's attractive fringe benefit program, competitive salaries, and graduate stipend programs.

Officials in the Bureau of Local Health Services forecast a need for increases in the number of sanitarians, but are not optimistic that more positions will actually be attained because the State Legislature has been very conservative with appropriations. Instead, the Bureau anticipates that more efficient procedures will be developed in order to keep up with increasing workloads. For example, operators of water treatment plants are being asked to collect the required samples and transport them to the sanitarians' offices. With new methods of this nature, an increase in the number of sanitarians might not be required, without sacrificing program quality or outputs. The annual turnover rate for sanitarians is approximately 8%.

Increased workforce in the five existing environmental laboratories will not be required, according to officials in the Bureau of Public Health Laboratories. However, a pesticide residue laboratory will be formed for analyzing pesticide content in drinking water. Two persons, probably chemists, will be required. Additional increases are not projected, as most water supply systems obtain their water from underground sources, and pesticides are not expected to be a problem.

Based upon the above information, the following table depicts approximations of future State workforce levels for persons working in the field of potable water on a full- or part-time basis.

TABLE VI

MISSISSIPPI STATE BOARD OF HEALTH

Potable Water Program Operations
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	% annum turnover (average)	%/annum growth (average)
Engineer	11	13	15	17	18	19	3%	11%
Attorney	0	1	1	1	1	1	N/A	20%
Sanitarian	126	126	126	126	126	126	8%	0%
Scientist	10	12	12	12	12	12	8%	4%
Other	3	4	5	6	6	6	10%	15%
TOTAL	150	156	159	162	163	164		2%

Based upon the number of operators attending training sessions, administrators project that in five years the State will have approximately 500 certified operators. The total number of operators is not expected to increase, however, because the number of supplies is not expected to increase, and may decrease as smaller sources are put out of operation and replaced by larger ones. While two or three surface water plants might be constructed within the next five years, two of the three existing surface water plants may convert to underground water supplies. Those supplies that utilize underground water would not require larger numbers of personnel to meet regulations, as in most cases only adequate chlorination would be required to meet drinking water standards. Industies are not injecting pollutants underground, and the water is relatively free of bacteria before drilling.

The turnover rate for operators is quite high, estimated to be at least 20% by State officials. This is attributed to the extremely low pay offered to operators.

The following table depicts approximations of the future numbers of certified water treatment plant and distribution system operators, based upon information from professionals in the Board of Health.

TABLE VII
MISSISSIPPI WATER TREATMENT AND WATER DISTRIBUTION
PLANT PERSONNEL (OPERATORS)

Workforce Projections to 1982 (est.)

Classification	1976	1977	1978	1979	1980	1981	% annum turnover (average)	%/annum growth (average)
A	15	16	17	18	19	20	20%	6%
B	15	16	17	18	19	20	20%	6%
C	51	79	107	134	162	190	20%	30%
D	72	112	151	196	236	270	20%	30%
TOTAL	153	223	292	366	436	500	20%	27%

D. Training and Certification

Informal on-the-job training is offered to new entrant engineers, in the Division of Water Supply who work under the supervision of a senior engineer for an unspecified period of time. Professors from Mississippi State University occasionally teach night courses at the State's Research and Development Center, often in the environmental field. Little is offered, however, in the field of water supply, except in relation to hydraulics. Employees are occasionally sent to EPA courses that are offered out-of-state. This activity is very limited, as travel budgets are small.

New sanitarians in the Bureau of Local Health Services take part in an orientation program in the central office in Jackson. Upon completion, they are sent to the county or district office where they will be working, and work under the supervision of an experienced sanitarian for a certain period of time. In the past three years there have been no funds to begin training a new employee before the person he/she is replacing leaves the Bureau. With accumulated sick and annual leave, a person may be off the job for six months before the vacancy is filled. Administrators feel that greater efficiency would be afforded

to the programs if the present system were revised and funds were available to begin training new sanitarians before vacancies actually occur. This need would not be as acute were colleges and universities offering environmental health curricula for sanitarians.

Sanitarians that are employed in the Bureau may be provided short concentrated courses at East Tennessee State University. Courses are offered during the summer and last ten weeks. During 1976, four sanitarians attended the program which consists of four courses in the environmental field.

The Bureau of Local Health Services offers in-service training quarterly for all sanitarians, and new policies and procedures are covered in these one-day sessions. Special training sessions are occasionally held pertaining to any special aspect of the sanitarians' work, occasionally in relation to water supply.

Sanitarians also participate in correspondence courses from the Center for Disease Control in Atlanta. The courses are usually in health-related fields, e.g., vector control. Seven courses are offered, and no sanitarian can be promoted without having completed all offerings. Courses can be taken for credit from Mississippi State University for a charge of $54 per course, and a test must be passed upon completion of each course. During 1976, 84 sanitarians were taking part in these courses, not all for credit.

Technologists in the environmental laboratories are usually trained informally. Those to be employed in the pesticide residue laboratory will probably require special training, which will be obtained from the Center for Disease Control or the Department of Agriculture.

Any employee with at least a bachelor's degree in the Board of Health may apply for a scholarship to attend graduate school out-of-state. Under this

program, full salary is paid, as well as tuition, book fees and one round trip travel expenses. Five persons per year in the Board of Health are sponsored.

The Mississippi Water and Pollution Control Operators Association sponsors week-long courses twice a year for water and wastewater treatment plant operators. Once per year, courses are offered at Mississippi State University at Starkeville for all four grades. In 1976, courses also became offered once a year for operators in grades "C" and "D" plants at the University of Southern Mississippi at Long Beach. One such course was offered in November of 1976, for which 102 water treatment plant operators were registered. Both courses will continue to be held yearly, and professionals from the Division of Water Supply are taking an increasing role in the teaching process. College and university professors, however, teach the courses for Grade "A" and "B" operators. No other training programs for water supply operators are available in the State.

The State Board of Health and the Water and Pollution Control Operators Association do not plan to implement mandatory certification within the next five years unless demanded by the federal or state governments. Professionals in the field would prefer to expand the present program because of its success to date, and believe that with enforcement activities expanding, operators will become voluntarily certified at an increasing rate in the future. In addition, the Division is holding seminars in every county of the State to educate operators regarding the new laws and their implications, which has provided impetus for operators to become certified. While a small market exists at the present time for institutional training programs in the field, the demand is expected to become greater in the future.

E. Career Potential

An increase in need for sanitary and environmental engineers is expected in the next five years for potable water operations in the State Board of Health. Increases could occur in the number of sanitarians involved in water supply activities, although openings will probably mainly occur as a result of turnover. Preference will be shown to those with education and/or experience in environmental health.

State professionals expect the number of certified operators to more than triple in the next five years, if the program continues to run smoothly and public opinion is positive, although the total number of operators is not expected to increase. Demands will be highest for those in the "C" and "D" classifications. This dramatic growth, coupled with a high operator turnover rate, should provide abundant opportunities for operators trained and certified at lower levels.

F. Conclusion

The Mississippi Safe Drinking Water Act was passed in 1976, and implementation is charged to the State Board of Health. Rules and Regulations are currently being prepared. Dramatic workforce increases at the State level are not expected, partially as a result of State budget limitations.

A voluntary water treatment plant operator certification program is in effect, and State professionals are finding increasing interest on the part of operators to become trained and certified. This trend is expected to grow as enforcement of the law takes place. The majority of operators are in, and will continue to be in Grades "C" and "D".

Training to operators is offered twice yearly under the sponsorship of the Mississippi Water and Pollution Control Operators Association. Professionals

believe that in the future a need will exist for institutional training programs.

Public disinterest and unconcern about safe drinking water is prevalent in Mississippi, and State administrators are concerned that attempts at rigid, strong enforcement would defeat the purpose of the Act. Public education and awareness programs must also be implemented to assure that the general public supports the drinking water program.

V. RADIATION

A. Introduction

The Mississippi Radiation Protection Act of 1976 designates the State Board of Health as the agency in charge of administering the statewide radiation protection program. A Radiation Advisory Council is created by the Act to advise the agency in the development of comprehensive policies and programs for the evaluation, determination, and reduction of hazards associated with the use of radiation and to assist in the formulation and approval of rules, regulations and standards regarding disposition of sources of radiation. The Council is composed of seven members, and one ex-officio member, as follows:

1) One member from the Senate;
2) One member from the House of Representatives;
3) One member from the Mississippi Medical Association;
4) One member from the Mississippi Dental Association;
5) One member from the Mississippi Radiological Society;
6) One member having recognized knowledge in the radiation field from private industry in Mississippi;
7) One member having recognized knowledge in the radiation field from one of the Mississippi institutions of higher learning;
8) The director of the Division of Radiological Health of the Mississippi Board of Health serves ex-officio as secretary.

Revision of regulations under the Act is currently underway, which will be accomplished every two or three years to maintain compatibility with federal regulations.

Mississippi's radiological health program began in 1960, and the first rules and regulations were developed in 1961. Mississippi became an Agreement State in 1962 with the Atomic Energy Commission (now the Nuclear Regulatory Commission) and the first piece of legislation was passed in 1964,

House Bill 499. At that time, the Agency registered all X-ray machines and licensed users of all radioactive materials. The agency is now developing a regulatory program for non-ionizing sources, and at the Governor's request, is developing a State Radiation Emergency Response Plan for fixed nuclear facilities.

Mississippi Power and Light is constructing the Grand Gulf Nuclear Station to consist of two units, one of which will be operable in 1980. The Tennessee Valley Authority is also planning to build the two-unit Yellow Creek Nuclear Plant within the State. In Louisiana, close to the Mississippi border, the River Bend Nuclear Station is being constructed by Gulf State Utilities. All of these reactor sites will be monitored by the Division of Radiological Health for environmental radiation, as will Ingalls Shipbuilding, Division of Litton Industries, Incorporated, which constructs and overhauls submarines.

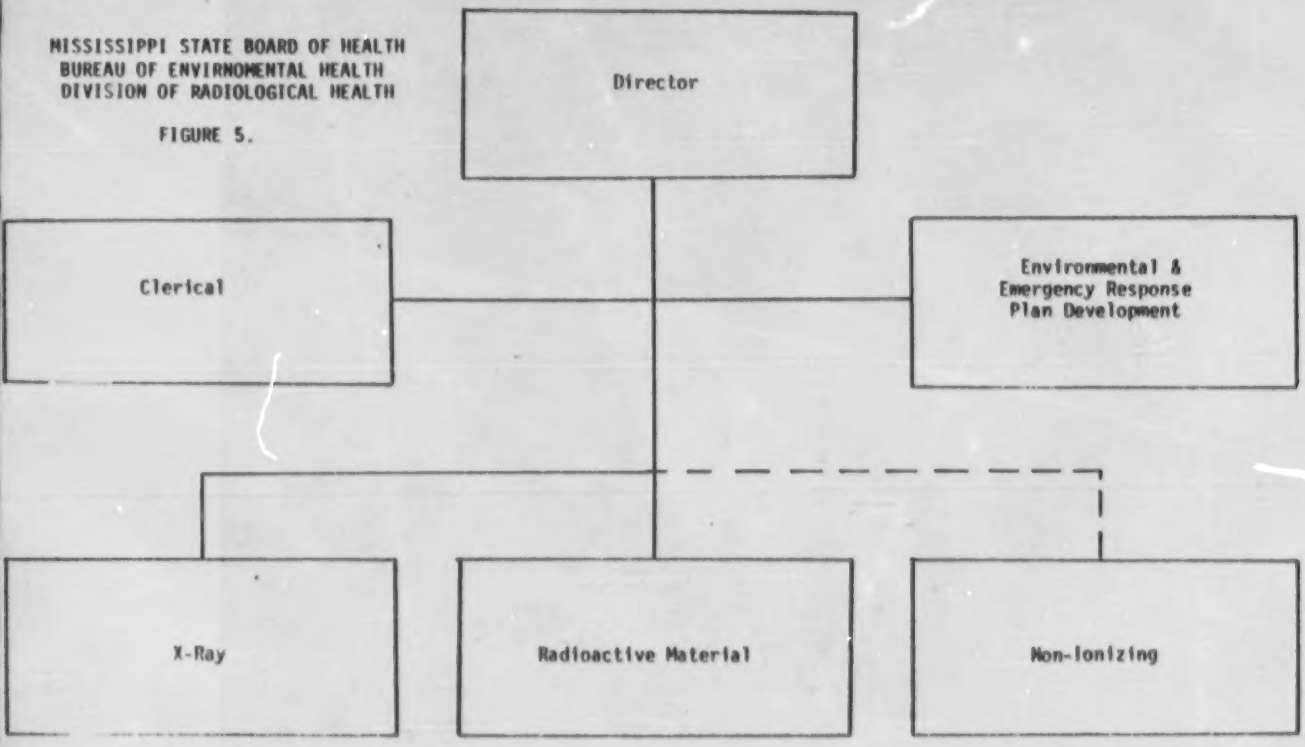
In the development of the Radiation Emergency Response Plan, the Board of Health will work in close cooperation with other State agencies, especially with the Civil Defense Council, with local units of government and private citizens, and with federal agencies. These agencies include the U.S. Environmental Protection Agency, the Nuclear Regulatory Commission and the Energy Research and Development Administration.

B. Workforce Profile

The Division of Radiological Health, a component of the Bureau of Environmental Health, State Board of Health, is charged with principal responsibilities for the radiation protection program. During Fiscal Year 1976, ten positions were budgeted to the Division, three of which were vacant. The budgeted positions included one director, two secretaries (one vacant),

MISSISSIPPI STATE BOARD OF HEALTH
BUREAU OF ENVIRNOMENTAL HEALTH
DIVISION OF RADIOLOGICAL HEALTH

FIGURE 5.



one chemist (vacant) budgeted through U.S. EPA, and six health physicists, one of which is on educational leave, to return in June of 1977.

The mission of the Division of Radiological Health is to conduct a regulatory program through which the exposure of the citizens of the State of Mississippi to biologically harmful ionizing and non-ionizing radiation is maintained at a level that is as low as reasonably achievable. Further, the Division, through a comprehensive monitoring and surveillance program, will determine levels of radioactivity that are present in the environment and determine whether the radioactivity could affect a pathway leading to humans and cause undesirable biological effects. Efforts are carried out through four main components, as follows:

Environmental and Emergency Response Plan Development: Budeted to this program are two health physicists and a chemist. The unit develops the Radiation Emergency Response Plan, develops and maintains a quality control program for environmental sampling, sample handling and preparation and data management, participates in the EPA-funded Mississippi Regulated Water Quality Program, conducts monitoring near nuclear sites, and participates in the EPA cross-checks radioanalysis programs.

X-Ray: Budgeted to this program are two health physicists. Duties include conducting the x-ray regulatory program, registering all machines in the State and conducting inspections, taking enforcement actions when necessary, participating in two federal programs, "Dental Exposure Normalization Technique" and "National Evaluation of X-Ray Trends", inspecting federally certified x-ray systems, conducting seminars and symposia to special interest groups, and investigating reports of excessive radiation exposure.

Radioactive Materials: Budgeted to this unit are two health physicists. Duties include issuing general and specific licenses for radioactive materials, conducting inspections and taking enforcement actions when necessary, conducting seminars to groups that utilize radioactive materials, conducting special projects and preparing required reports to the Nuclear Regulatory Commission.

Non-Ionizing Radiation: This unit currently contains no permanently-assigned staff. The Division's staff has inspected commercially-available microwave ovens and with the assistance of the Bureau of Radiological Health, U.S. Food and Drug Administration, has honored several requests for assistance.

According to Mississippi State Merit System requirements, a Health Physicist I must have graduated from a recognized college or university with a major in physics, chemistry, mathematics, or closely related fields, with no prior experience required. At higher levels, increasing amounts of education and/or experience are required. Personnel are recruited through the State Merit System, and most new personnel are recent college graduates, as the Division has difficulty in recruiting experienced professionals because the pay scale is lower than that in private industry or other state or federal regulatory agencies.

The following table depicts current State workforce levels for those working in the field of radiation control (including budgeted vacancies).

TABLE VIII

MISSISSIPPI STATE BOARD OF HEALTH

Division of Radiological Health
Current (1976) Staffing Level

Position	1976
Health Physicist	7
Chemist	1
Other	2
TOTAL	10

There is currently one nuclear project operating within the State. Radiation control workforce levels are unavailable. However, data from comparable operations in the Southeast indicates that there may be one or two health physicists and eight to ten health physics technicians employed for

inplant and environmental radiation control. In addition, State sources indicate that three to four consulting firms offer radiation control services in Mississippi, mainly to medical facilities. Staffs are consisted principally of health physicists and radiation physicists.

C. Workforce Projections

The Division has requested funds for four additional health physicists to be added to the staff for Fiscal Year 1977. Two of these will be assigned to the X-ray program, one to the radioactive materials program, and one to the non-ionizing program. Monitoring around nuclear facilities will be started during Fiscal Year 1977, and the director of the Division anticipates that local health department sanitarians can be utilized for collecting samples, through the Board of Health's Bureau of Local Health Services. Arrangements, however, have not been finalized.

Increased needs beyond the projected 1977 workforce levels are not anticipated in any programs except in the Environmental and Emergency Response Plan Development Program. Administrators anticipate a need within several years for one or two technicians, preferably from associate degree programs for assistance in environmental monitoring. Depending upon federal actions, an additional health physicist may be needed for the non-ionizing program, although probably not within the next five years.

Turnover has typically been very low in the Division. Two professional and two clerical employees have left in the past eleven years.

The following table depicts future State workforce levels in radiation control, as projected by State sources. Note that local health sanitarians are not included, as decisions regarding their activity in the program have not yet been reached.

TABLE IX

MISSISSIPPI STATE BOARD OF HEALTH

Division of Radiological Health
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	% annum turnover (average)	%/annum growth (average)
Health Physicist	7	9	10	11	11	11	2%	7%
Chemist	1	1	1	1	1	1	2%	0%
Technicians	0	0	2	2	2	2	N/A	40%
Other	2	2	2	2	2	2	2%	0%
TOTAL	10	12	14	16	16	16		11%

Mississippi Power and Light will begin the formation of a radiation control staff in the near future for the Grand Gulf Nuclear Station, now under construction. Officials feel that three or four chemists will be hired for the necessary analytical work. Health Physicists and technicians will also be hired, but officials are unable to determine the specific requirements at this time. TVA's Yellow Creek Nuclear Plant is not scheduled to operate until 1985 or 1986. However, radiation control staffs will be formed before the actual operation, and by 1982 there may be one health physicist and five technicians, based upon input from TVA officials.

Due to the increased usage of radioisotopes and X-ray machines by medical facilties, State officials project that additional consulting firms will be formed. An approximate 20% annual growth rate, is anticipated raising the number of firms to nine or ten by 1982, according to projections. Requirements should continue to be for health physicists and radiation physicists.

D. Training and Certification

New entrants into the Division of Radiological Health are provided with informal on-the-job training, working under the supervision of a more experienced employee for a varying length of time. Personnel also attend technical

upgrade training courses. One such course is a ten-week program offered annually at Oak Ridge which all personnel attend. Courses offered by the Nuclear Regulatory Commission are also utilized, which are held at various locations throughout the country. Courses are available from various sources in such areas as industrial radiography, nuclear medicine, management, inspections, regulations and licensure, and the Division sends employees to these courses as often as funds will allow. State officials feel that additional training needs are not being met, however, and would like the Nuclear Regulatory Commission to provide states with training regarding the preparation of emergency response plans.

The U.S. Environmental Protection Agency and the Food and Drug Administration no longer support training programs for radiation, which has left additional training voids. To offset this training problem that states were experiencing the Region IV Environmental Protection Agency has formed a Regional Training Committee. EPA Headquarters and Region IV personnel participate, as do state radiation program directors and the Food and Drug Administration. Symposiums are held two or three times a year where training voids are determined and plans of action are discussed and implemented. Outgrowths of these symposiums are courses offered to state radiation personnel. Two courses were held during 1976, "Management of Radiation Incidents - Fixed Facilities" and "Basic Radiological Health - X-Ray and Environmental Radiation." Mississippi participates in this Regional Training Committee, and personnel will continue to attend courses as budgets will allow.

Employees with bachelor's degrees who have worked in the Board of Health at least three years are eligible for State Scholarships to receive master's degrees. One person in the Division of Radiological Health has been sponsored

in this manner, but many employees at the present time have not worked with the Board long enough to be eligible.

The Division of Radiological Health provides safety training to medical and dental x-ray technicians at various schools throughout the State. This training consists of two-to-three hour lectures, which are offered approximately six times each year. In addition, eight to ten times per year, Division staff visit State Highway Patrol stations to provide information concerning the management of radiation accidents on highways. Division personnel would like to expand these types of services, but cannot do so at the present time because of workforce limitations.

E. Career Potential

In the public sector, officials project the additions of four health physicists and two technicians. Opportunities resulting from turnover are expected to be minimal. In the state's operating and scheduled nuclear facilities, opportunities should be available for chemists, health physicists and health physics technicians. Medical facilities will require the availability of increasing numbers of health physicists and radiation physicists for radiation control. These needs may be met by hiring these professionals for hospital staffs, or by contracting with private consulting firms.

F. Conclusion

Two additional nuclear reactors are being planned or constructed in Mississippi, which will require increases in workforces for radiation control, principally health physicists, chemists and health physics technicians. The increasing usage of radioisotopes by medical facilities should cause increased needs for health physicists and radiation physicists. Within the State program,

workforce increases are projected to occur within the next several years, for health physicists and technicians.

In order to assist States in meeting technical training needs, Region IV EPA has formed a Regional Training Committee, which determines training needs and develops and offers courses that have been determined to be needed. State officials feel the need to expand the safety training that they offer to those in the private sector that use sources of radiation, but are currently faced with inadequate resources.

VI. SOLID WASTE

A. Introduction

The Mississippi Solid Wastes Disposal Act of 1974 gives authority for regulating solid waste management to the State Board of Health. The Act authorizes the Board to prepare the rules and regulations needed to specify methodology and procedures to meet the requirements of the Act. Regulations were developed to regulate the collection, transportation, processing, handling, storage and disposal of solid wastes generated in or transported into the State.

All individuals constructing or operating a facility or system for solid waste handling or management must obtain a permit from the State Board of Health. Permits are also required for the collection, transportation or disposal of sludges, for the operation of salvage yards, for processing and resource recovery, and for reduction and disposal. Further, regulations are defined for proper methods of storage, collection and transportation of solid wastes. Authority has been granted to the Board to regulate hazardous wastes, although a permit system has not yet been implemented. Those generating hazardous wastes are required to submit a proposal to the Board providing waste content and the proposed method of disposal. The Board provides assistance and recommendations at the present time, although stricter regulations will be enforced when the permitting system is implemented in the near future.

The Board plans to have a landfill in every county in the next five years, with all open dumps closed. There are currently 67 landfills in operation, approximately 85% public and 15% private with more than one in some more populous counties, and few designated dumps. Some rural areas still utilize promiscuous dumps, which will be closed through enforcement processes. Some

recycling is carried out in the State, all by private enterprise. Automobile recycling is the largest effort, and approximately 1,500 automobiles per day are reprocessed by steel mills. As Mississippi is a large producer of fryers and laying hens, feathers are reprocessed to protein and used for livestock feed. Catfish remains are reprocessed in much the same manner. Reprocessing of livestock wastes, especially from deer barns, is performed on an experimental scale. The State's largest volume of wastes comes from agriculture, especially in the cotton industry. Gin wastes are voluminous, although recycling methods have not been successfully implemented. Farmers are reluctant to respread these wastes over fields, and often burn them, creating air pollution problems.

There is one major hazardous material disposal site in the State, although several small experimental sites are in operation. One such site utilizes a trench lined with clay and filled with sawdust, which is compacted and sodded. A pipe leads into this trench into which liquid and sludge wastes are poured. The other experimental operation mixes cement filings with acidic wastes to form a neutral manageable mixture for landfilling. These sites are being monitored by the State to develop parameters to detect environmental effects.

The State has a law that places a $500 fine for littering. This law is very difficult to enforce, so this behavior is dealt with through a constant public education program, directed primarily at schools.

The Board of Health is beginning to become involved in developing alternative methods to deal with sludges. Wastewater treatment plants currently may spread sludges evenly over the ground, or deposit them in landfills. Industrial sludges are dealt with on a case-by-case basis. Guidelines are currently being prepared by the Board.

A feasibility study will be performed in the gulf coast area to develop a new type of solid waste disposal system, as landfilling is hazardous in this region. The State will request assistance from the Federal Resource Conservation and Recovery Act for planning, and possibly for demonstration. Possible methods to be developed include composting and pyrolysis.

As a result of the recent passage of the Federal Resource Conservation and Recovery Act, activities will be stepped up at the State level, and workforce levels will increase. The Act requires that all dumps be eliminated within five years, and hazardous wastes will be managed through a permitting process from the point of generation to the point of disposal. Rural areas will be affected, as monies will be available to develop solid waste systems that would otherwise be economically unfeasible.

B. Workforce Profile

Chief responsibilities for the implementation and administration of the statewide regulatory program for solid waste management are carried out by the Division of Solid Wastes Management and Vector Control of the Bureau of Environmental Health, Mississippi State Board of Health. The overall mission of the Division is to regulate and manage all of the solid waste disposal operations in the State so that they do not cause a public health or environmental problem. Among the objectives of the Division are the following:

1) To develop the necessary rules and regulations.
2) To perform site inspections of proposed landfill sites.
3) To approve/disapprove all permits for the development of new landfills based upon plans submitted and geological data.
4) To provide technical assistance to cities, counties, and private industries and firms.
5) To assist in the training of landfill operators.
6) To enforce the Solid Wastes Disposal Act.

Working in solid waste activities in the Division are one director, four sanitarians and an engineer. Supporting the program are two regional engineers that also provide services for other programs of the Bureau of Environmental Health. In addition, approximately 125 sanitarians of the Board's Bureau of Local Health Services, located in county offices throughout the State, perform site monitoring and other activities for the Division in addition to their other job duties.

Engineers who are currently employed have come from civil engineering backgrounds. Sanitarians are required to be college graduates with at least eighteen hours of sciences courses. One sanitarian in the Division of Solid Waste Management and Vector Control is responsible for providing training to landfill operators.

Vacancies are filled through the State Personnel Office, which maintains a list of qualified applicants. This Division files a Request for Personnel Action with the State Budget Committee, which reviews it and sends it to the Governor for final approval. According to interviewed officials, this complicated procedure causes lengthy delays, and positions often remain vacant for extended periods of time. In most cases, qualified applicants are listed on the register, and the Division may choose from the top five candidates. The Bureau of Local Health Services, however, indicates that it has difficulty in recruiting sanitarians with adequate environmental knowledge.

The following table depicts the numbers of persons in the Mississippi State Board of Health currently working full- or part-time in the field of solid waste:

TABLE X

MISSISSIPPI STATE BOARD OF HEALTH

Solid Waste Program Operations
Current (1976) Staffing Level

Position	1976
Engineer	3
Sanitarian	129
Other*	1
TOTAL	133

*Administrator

The Board of Health has no soil scientists or geologists, and must rely upon State Geological Survey professionals for ascertaining the geological acceptability of land areas for future landfill sites. Three geologists and three assistants currently perform these functions.

There are currently 67 landfills in the State, and State sources indicate that on the average, each site employs two people: a landfill operator and a spotter. From this information, it is estimated that currently 134 persons are employed at landfill sites, 67 operators and 67 spotters. Spotters usually learn to operate, and often perform this function when needed.

In order to ascertain the estimated total workforce in solid waste management, the Division contacted key counties and municipalities and deduced total figures based upon the populations in service areas. In 1976, it is estimated that 1,111 persons work in solid waste management. Excluding operators and spotters, the bulk of these people work in collection. It follows, then, that approximately 977 work in solid waste collection in Mississippi.

The one hazardous materials site in the State is staffed with two persons. State sources indicate that to estimate the numbers involved in all types of resource recovery activities in the private sector would be extremely difficult at the present time.

C. Workforce Projections

The Division of Solid Waste Management and Vector Control would like to add a secretary and another sanitarian to the staff to assist in training of landfill operators. In addition, in view of the recent passage of the Federal Resource Conservation and Recovery Act, a mastered chemist with an industrial background will be required to keep continuous logs of hazardous wastes being generated, handled and disposed of in the State, and to provide technical assistance. Finally, an attorney is desired, to share with the potable water program, for enforcement purposes. Administrators are unsure if they can get an attorney, but may settle for a person with a background in business administration, and legal knowledge. The Division anticipates that the two regional engineers will be replaced eventually with sanitarians, although this action is not assured. Since 1969, only one sanitarian has left, and two transferred into potable water programs. Turnover that has occurred is partially attributed to low pay scales.

Officials in the Bureau of Local Health Services forecast a need for increases in the number of sanitarians, but are not optimistic that more positions will actually be attained because the State Legislature has been very conservative with appropriations. Instead, the Bureau anticipates that more efficient procedures will be developed in order to keep up with increasing workloads, so that an increasing number of sanitarians will not be required, without sacrificing program quality or outputs. The annual turnover for sanitarians is approximately 8%.

Based upon the above information the following table depicts approximation of future workforce levels within the State Board of Health for persons working in the field of solid waste management on a full- or part-time basis.

TABLE XI

MISSISSIPPI STATE BOARD OF HEALTH

Solid Waste Program Operations
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	% annum turnover (average)	%/annum growth (average)
Engineer	3	3	3	3	3	3	4%	0
Attorney	0	1	1	1	1	1	N/A	20%
Sanitarian	129	130	130	130	130	130	3%	1%
Scientist	0	1	1	1	1	1	8%	20%
Other	1	2	2	2	2	2	N/A	20%
TOTAL	133	137	137	137	137	137		1%

State sources indicate that needs for additional personnel in the Geological Survey assisting in landfill siting will not occur. These studies have been performed in nearly every county, and locations have already been chosen.

In order for a landfill to have been established in every county of the State as is projected, the total number must increase by approximately 30%. According to administrators, these landfills will probably continue to utilize one operator and one spotter each. According to projections, then, within the next five years, the State's landfills will employ approximately 87 operators and 87 spotters. State officials estimate the turnover rate for operations personnel to be 35%. This rate is high because cities and counties do not offer salaries that are competitive with agencies and industries that utilize heavy equipment operators.

Based upon anticipated populations in service areas, State sources project that the total number of employees in solid waste management in the private sector will be approximately 1,456 by 1982.

The following table depicts projected workforce levels for landfill operations and solid waste collection.

TABLE XII
MISSISSIPPI SOLID WASTE PERSONNEL
Private Sector
Workforce Projected to 1982 (est.)

	1976	1977	1978	1979	1980	1981	% annum turnover (average)	%/annum growth (average)
Collection	977	1,038	1,099	1,160	1,221	1,282	35%	6%
Disposal:								
Operator	67	71	75	79	83	87	35%	5%
Spotter	67	71	75	79	83	87	35%	5%
TOTAL	1,111	1,180	1,249	1,318	1,387	1,456	35%	6%

Due to the passage of the Federal Resource Conservation and Recovery Act, seven additional hazardous materials disposal sites are being planned, to be operational within several years. State personnel anticipate that approximately two laborers will be employed at each site. Technical expertise will hopefully be provided by private industries utilizing the sites. As few professionals are available with expertise in the field, sources indicate that State or federal regulatory agencies will have to provide extensive training to the private sector.

The future of resource recovery in the State, according to State officials, hinges upon the future market for recovered materials. The Board of Health will promote resource recovery, but the area will not expand unless the cost of recovering materials is cheaper than the cost of landfilling them. Mississippi will probably not find this process economically feasible in many areas because of the rural nature of the State. Volumes of wastes generated in most areas are not large enough to develop a feasible recovery system.

D. Training and Certification

Informal on-the-job training is offered to new entrants within the Division of Solid Wastes Management and Vector Control, whereby these persons

work under the supervision of an experienced employee for a varying length of time. Little upgrade training in the field is available in the State. Because other states were also having problems in identifying the needed available technical training, U.S. EPA Region IV formed a regional training committee, composed of the directors of the solid waste programs in the Region IV states and EPA staff. This committee identifies training voids and develops and offers courses for state personnel to fill these needs. The first course, "Elements of Solid Waste Management", was offered in Atlanta, Georgia in November, 1976. Mississippi personnel attended this course, and felt it was very successful. State sources feel that EPA has a responsibility to train State personnel, while States have the responsibility to train persons at the local level, e.g., landfill operators. State sources indicate that their largest training need is in the area of landfill siting and monitoring.

New sanitarians in the Bureau of Local Health Services take part in an orientation program in the central office in Jackson. Upon completion, they are sent to the county or district office where they will be working, and work under the supervision of an experienced sanitarian for a certain period of time. Sanitarians are also offered short concentrated courses from East Tennessee State University and many participate in correspondence courses from the Center for Disease Control. The Bureau of Local Health Services offers in-service training quarterly for all sanitarians. For more detail regarding these programs, see the Potable Water section.

Any employee with at least a bachelor's degree in the Board of Health may apply for a scholarship to attend graduate school out-of-state. Under

this program, full salary is paid, as well as tuition, book fees and one round trip travel expenses. Five persons per year in the Board of Health are sponsored.

The Division of Solid Wastes Management and Vector Control employs a training officer that spends three to four days with each new operator to teach him/her the basic procedures. Training is conducted through hands-on procedures, and includes maintenance and safety of equipment. Follow-up visits are performed when needed. This method has proven effective, according to State sources, although because operator turnover is so large, the officer is unable to reach every new operator. To help alleviate this situation, the State requires that a supervisor be present when a new operator is trained so that he/she can provide the training should another person be hired. The State hopes to obtain money from the new Act to expand its training programs. This could be institutional or field training, or a combination of the two. State personnel believe that cities are beginning to recognize the importance of the job and are making the job more attractive. When salaries are raised to competitive levels, the turnover rate should decline.

The Division also offers occasional training programs for supervisors of landfills. The most recent, in the fall of 1976, related to safety in solid waste management.

One junior college offers a landfill operator training program in the State, as a part of a heavy equipment operators program. Another school is developing this same capacity.

E. Career Potential

Within the Division of Solid Wastes Management and Vector Control, the solid waste staff is expected to see an approximate overall 30% increase in

staffing level as a result of the passage of the Federal Resource Conservation and Recovery Act. A person with a legal background will be added, as well as a chemist and a sanitarian. To fill all vacant positions, administrators will show preference to those with environmental coursework and/or experience, especially in the field of solid waste management. The number of regional sanitarians in the Bureau of Local Health Services is not expected to increase. Again, for hiring purposes, preference will be shown to those with environmental backgrounds.

The number of landfill operators is expected to increase by approximately 30% within the next five years. A moderate upgrading of skills will probably be required, which is expected to be met through an expansion of the State's operator training program.

New careers emerging in the field of resource recovery will be contingent upon the markets available for the recovered materials. Limited opportunities related to energy conversion may appear in the gulf coast area, dependent upon the outcome of a feasibility study to be conducted.

State sources project that as a result of the new Act, the field of solid waste management will grow dramatically, creating significant needs in the public and private sectors for persons trained in all aspects of the field. These needs will occur for professionals with bachelor- and master-level degrees, and to a smaller extent for technician level personnel. An area that has been identified that needs much further development and training for is in the management of hazardous wastes, and significant needs exist for persons that understand the interrelated actions between the soils and the wastes.

F. Conclusion

The Mississippi Solid Wastes Disposal Act regulates solid waste activities in the State and charges the State Board of Health to implement its provisions. Within the Board, an increasing emphasis is taking place in the field of solid waste as a result of the recent passage of the Federal Resource Conservation and Recovery Act. Moderate workforce increases are expected to occur, and the availability of additional expertise will be required for the siting and monitoring of landfills and in the field of hazardous wastes and to some extent, in resource recovery. Upgrade training voids are being tackled by a regional training committee recently formed by U.S. EPA, Region IV.

In the private sector also, industries will require additional expertise, especially in relation to the handling and disposal of hazardous wastes, and their interactions with soils. At the present time, colleges and universities are not offering curricula or courses in the field to meet the forthcoming needs.

The number of landfill operators is expected to increase by approximately 30% in the next several years, as new landfills are opened. The Board of Health anticipates expanding its operator training program to cope with this increase, providing operators with upgraded skill levels.

In sum, the field of solid waste is expected to demonstrate a significant growth within the next several years, and experts in the field will be in great demand. Educational institutions, however, are not offering the courses or curricula that would provide the experts that are needed.

VII. WASTE WATER

A. Introduction

The Mississippi Air and Water Pollution Control Act was enacted in 1968 and amended in 1973 to conform with federal air and water pollution control laws. The Act created the Mississippi Air and Water Pollution Control Commission, composed of ten members representing various State agencies, local government, industry and agriculture. The Commission appointed an executive director, and a staff was formed to implement the purposes of the Act.

The Act declares it unlawful for any person to cause pollution of any waters of the State or to place wastes in locations that would cause pollution. Also declared illegal is the discharge of wastes into waters which would reduce the water quality below established standards. Further, permits are required for the construction, installation, modification or operation of any disposal system, for increasing the strength of discharges above levels specified in existing permits, for the construction, installation or operation of any disposal system, for increasing the strength of discharges above levels specified in existing permits, for the construction, installation or operation of an establishment that would cause an increase in waste discharge, and for the construction or use of any new waste outlet. A Permit Board is established by the Act for reviewing applications for and issuing, modifying, revoking or denying permits required by the Act. This Board is composed of five members, all from State agencies.

State sources indicate that the law is comprehensive and allows the Commission the needed flexibility for adequate enforcement. The law is also sufficiently general that the Commission has power to direct its own courses of action to a great extent.

A voluntary certification program for wastewater treatment plant operators and water treatment plant operators is coordinated by the Mississippi Water and Pollution Control Operators Association, Incorporated. Policies and procedures for this program were prepared in August, 1971, when the program took effect. These policies and procedures classify all plants on the basis of complexity and size of populations served. One of the basic goals of the policy is to have every operator in responsible charge of a wastewater treatment plant hold a certificate in a grade equal to or higher than the grade of his/her treatment plant or distribution system.

As of December, 1976, there were 1,130 wastewater treatment facilities in the State as follows:

Municipal	384
Private, Federal Institutional	471
Industrial	275

According to State sources, the majority of facilities are small, principally lagoons. Some cities, however, are implementing more sophisticated methods. These sources feel that the State is unique in that it does not meet such extensive problems in abating and controlling water pollution that many other states do.

B. Workforce Profile

Functions relating to wastewater pollution control take place in both the Water Quality Control and the Field Services components of the Mississippi Air and Water Pollution Control Commission. Water Quality Control has two main branches: the Private Facility Branch and the Public Facility Branch. Functions of these Branches include the following:

Private Facility Branch: Responsible for requiring adequate treatment of all non-municipal dischargers, including industrial, commercial and privately-owned facilities. Reviews plans and specifications of facilities, issues NPDES permits and performs the compliance, monitoring and enforcement efforts associated with the permit requirements.

Public Facility Branch: Responsible for requiring adequate treatment of all municipal wastewater treatment dischargers, and the development, processing and certification of application for matching federal grant funds for the construction of municipal wastewater treatment facilities as authorized by P.L. 92-500. Issues NPDES permits to municipal facilities, and conducts planning efforts as required by the federal law.

Also within Water Quality Control is an operator training program. The Field Services component of the Commission provides supporting services to the air and water program, with personnel located in three regional offices, in Oxford, Ocean Springs and Jackson. These persons perform monitoring, maintenance of monitoring equipment, and inspections of facilities. A laboratory is located in Hattiesburg that performs all of the proper analytical services required for enforcement.

In the Commission, 78 persons work full- or part-time in water pollution control. However, 68 person-years are spent in the wastewater field, broken down as follows: 20.6 engineers, two biologists, two chemists, 23.4 pollution control technologists, three pollution control instructors and 17 "other" (includes administrative support and clerical). Thirty of these positions are in the Water Quality Control component, and work full time in wastewater, while the remainder work in the regional offices, the laboratory, or in administration.

Preferred for engineering positions by Water Quality Control are civil engineers, chemical engineers, and sanitary engineers. Unavailable in Mississippi are bachelor-level programs in environmental engineering, but

administrators do not find this lack a significant problem.

Pollution Control Technologists (PCT's) range from levels II through V. PCT II's require two years of college work in a technically-related area, while PCT III's must have a bachelor's degree in a technically-related field. The program administrators search for majors in chemistry, biology or environmental science to fill these positions. Those with a bachelor's degree and six years of experience may advance to become PCT IV's, who usually supervise regional offices. In water programs, in person-years there are 13 PCT II's, and 10.4 PCT's at higher levels.

Vacant positions are filled through the State Classification Commission, and higher level positions are often filled from within, creating new vacancies. Administrators choose the persons to fill the vacancies, after which time it takes four to six weeks to actually fill the positions. To find qualified personnel, universities within the State are contacted for locating and recruiting applicants. This procedure has proven to be very successful.

Engineering positions have not been difficult to fill, but administrators expect this situation to change because the salary differential between the State and private industry is becoming greater. Pollution Control Technologists are readily available, as many local colleges and universities are offering degrees in biology and chemistry.

The following table depicts the total number of personnel engaged in water quality control activities in the Mississippi Air and Water Pollution Control Commission, in person-years:

TABLE XIII

MISSISSIPPI AIR AND WATER POLLUTION CONTROL COMMISSION

Waste Water Pollution Control
Current (1976) Staffing Level

Position	1976
Engineer	20.6
Scientist	14.4
Trainer	3.0
Technician	13.0
Other*	17.0
TOTAL	68.0

* Includes administrative support and clerical

As of December, 1976, there were 244 certificates issued to wastewater treatment plant operators in classifications "I", "II", "III", and "IV", corresponding to the level of plant that each person is operating. Class IV is the highest level. An operator is defined by the Mississippi Water and Pollution Control Operators Association, Inc., as one who is in direct responsible charge of the operation of the plant. State sources indicate that the number of non-certified operators-in-charge is probably much less than the number of certified operators. The total number of operators is estimated to be 1,300.

The following table depicts the current number of active certificates, by category:

TABLE XIV

STATE OF MISSISSIPPI

Certified Wastewater Treatment Plant Operators
Current (1976) Staffing Level

Classification	1976
I	79
II	120
III	33
IV	12
TOTAL	244

Two areas of Mississippi are impacted by Section 208 designated area-wide planning agencies. One of the agencies is located in Memphis, Tennessee, and the other near Corinth, Mississippi. Staffs for this type of planning tend to be quite small, and most work is conducted by contracting to other agencies and consulting firms.

Private consulting firms also provide services in the design and construction of wastewater treatment facilities. In the Directory of Consulting Engineering Organizations in Mississippi, Volume I, 1975 edition, published by the Engineering Extension Service of the College of Engineering, Mississippi State University, 78 private engineering consulting firms are cited that have expertise in sanitary engineering. Eight of these are branch offices of other listed Mississippi-based firms.

According to State sources, many industries in Mississippi utilize consultants for design of facilities, while some larger industries utilize their own staffs, often from out-of-state corporate headquarters offices. For maintenance functions, the more complex facilities require engineers while others utilize chemists and biologists. These persons often perform these functions as a small part of their overall in-plant responsibilities.

C. Workforce Projections

The State workforce in water quality has been stable for approximately one year, as functions have shifted towards maintenance of ongoing programs. Administrators do not anticipate that significant growth will take place within the next five years, beyond several additional engineers, unless currently-unforeseen changes in strategy occur from the federal level. Another factor indicating that workforce increases will be minimal is the reluctance on the part of the State Legislature to spend additional monies.

The following table depicts projections of future workforce levels within the Commission for water quality control, based upon the best professional judgments of administrators. Figures have been rounded to the nearest whole number.

TABLE XV

MISSISSIPPI AIR AND WATER POLLUTION CONTROL COMMISSION

Wastewater Pollution Control
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	% annum turnover (average)	%/annum growth (average)
Engineer	21	21	22	22	23	23	10%	2%
Scientist	14	14	14	14	14	14	5%	0
Technician	13	13	13	13	13	13	5%	0
Other	20	20	20	20	20	20	5%	0
TOTAL	68	68	69	69	70	70		1%

Engineers have the highest turnover rate, because of the higher pay scales offered in industry and the federal government. Technologists have a low turnover rate, as the current employment market is over-supplied with persons from these backgrounds.

State administrators project that the number of certified operators will more than double in the next five years. This is due not only to the accelerating move towards certification on the part of operators, but also to the construction, expansion and upgrading of treatment plants that is occurring. For the latter reason, a larger growth rate is expected to occur in Classes III and IV than in Classes I and II. State officials estimate the average annual turnover rate to be approximately 10%.

The following table depicts future numbers of certified wastewater treatment plant operators, as projected by officials in the Mississippi Air and Water Pollution Control Commission:

TABLE XVI

STATE OF MISSISSIPPI

Certified Wastewater Treatment Plant Operators
Workforce Projections to 1982 (est.)

Classification	1976	1977	1978	1979	1980	1981	% annum turnover (average)	%/annum growth (average)
I	79	93	107	122	136	150	10%	13%
II	120	141	162	183	204	225	10%	13%
III	33	46	60	73	87	100	10%	25%
IV	12	20	27	35	42	50	10%	34%
TOTAL	244	300	356	413	469	525	10%	17%

D. Training and Certification

New entrants into the State wastewater program are assigned projects and work under the supervision of an experienced employee. These persons also spend time in the field to get a more complete picture of the overall program. According to administrators, this process is thorough and effective, and after approximately six months, most new personnel are very productive.

Wastewater personnel are able to attend short courses sponsored by universities in the State. In addition, professors from State universities are hired to lecture wastewater personnel on appropriate subjects, dependent upon the needs, approximately two times per year. The State does not sponsor employees to participate in graduate training. However, two persons per year in the wastewater program are sponsored for graduate education under EPA traineeships.

The by-laws of the Mississippi Water and Pollution Control Operators Association, Inc., established a Board of Examiners to assist the State agencies in the administration of the certification program. The Board is charged with the responsibility of conducting all work necessary to promote the program, of maintaining records, and of adopting rules and policies. The Board also holds two examinations per year and collects all fees. The Commission

prepares, conducts and grades examinations for wastewater treatment plant operator certification.

Two times per year the Association sponsors five-day short courses for wastewater treatment plant operators and water treatment plant operators. These courses are held in Jackson at Mississippi State University and in Long Beach at the University of Southern Mississippi. Trainers and other professionals from the Commission perform a large role in the teaching process at these short courses. These sessions offer training for all four levels of operators.

The remainder of the formal operator training, which is offered by the Mississippi Air and Water Pollution Control Commission, is based upon one-day and three-day workshop study sessions. One-day seminars provide training restricted to one unit or phase of the treatment process. Three-day operations and maintenance (O&M) sessions are restricted to one level or category of plant requirements, e.g., Class I, II, III or IV, with emphasis placed on Classes II and III during Fiscal Year 1977. Three-day Mathematics - O&M sessions offer instruction in all four plant classifications. Three-day laboratory workshops are restricted to one type of treatment process for plants with operational laboratories, or having plans for laboratory facilities.

O&M instruction is built around the Water Pollution Control Federation Manforce Training Module - 01, Water Pollution Control Federation manuals, Environmental Protection Agency manuals and audiovisual materials, and the Sacramento State University manual for wastewater plant operators. The Environmental Protection Agency manual entitled "Self-Monitoring Procedures: Basic Parameters for Municipal Effluents" is used as the instructional guide in laboratory workshops.

The three operator training instructors of the Commission provide O&M instruction. Staff engineers and pollution control technologists assist in the three-day Mathematics - O&M sessions. The Commission laboratory staff conducts the laboratory training sessions with the assistance of operator training instructors.

In addition to the formal seminars and workshops, Commission staff perform many on-site training sessions for individual operators. Professionals feel that this type of training allows the staff to fully address itself to the particular problem or problems of the single operator. It is further believed that O&M problems, and difficulties operators encounter with the self-monitoring requirements of the NPDES program are most effectively solved with this type of training.

Commission staff strongly believe that the need exists for these types of upgrade training opportunities that are offered, for all facilities in the State, domestic and industrial. Plant superintendents and operators are urged to use information obtained at the training sessions in their in-plant training to expedite the training of the approximate 1,300 operators in the State.

The following table depicts formal training sessions offered to wastewater plant operators during Fiscal Year 1976. Total attendance at these sessions was 286.

TABLE XVII

STATE OF MISSISSIPPI

Training Activities during Fiscal Year 1976
for Wastewater Treatment Plant Operators

Activity	Number of Sessions
Study - Review Session	1
Operations and Maintenance	9
Laboratory	4
Annual Short Course	1

Depicted in the following table are the planned activities and anticipated attendance for Fiscal Year 1977, as prepared by the Mississippi Air and Water Pollution Control Commission:

TABLE XVIII

STATE OF MISSISSIPPI

Training Activities Planned for Fiscal Year 1977
for Wastewater Treatment Plant

Month	Activity	Estimated Attendance
October	Laboratory Workshop	10
	One-Day O&M Workshop	5
November	Five-day Short Course Certification Exams	40
December	One-day O&M Workshop	5
	One-day O&M Workshop	5
January	Laboratory Workshop	10
	One-day O&M Workshop	5
February	Three-day O&M Workshop	15
March	Three-day Mathematics - O&M Workshops	20
April	Laboratory Workshop	10
	One-day O&M Workshop	5
May	Five-Day Short Course Certification Exams	60
June	Three-day Industrial Operator's O&M Workshop	20
July	Three-day O&M Workshop	15
August	Laboratory Workshop	10
	One-day O&M Workshop	5
September	Three-day Mathematics O&M Workshop	20
TOTAL		260

Sources in the Commission indicate that this overall program has met with a great deal of success. No major changes are planned for the program.

E. Career Potential

Career opportunities in wastewater within the Air and Water Pollution Control Commission will not be abundant. Several engineers may be added to the staff within several years, and a number of openings may occur as a result of turnover. Opportunities for other positions will be even more scarce, as no other new positions are expected to be created, and turnover is quite low.

The number of certified wastewater treatment plant operators is expected to double in the next five years. The largest numbers will remain in Classes I and II, although increasing demands will occur for operators with higher skill levels, in Classes III and IV. The minimum amount of experience in a facility required to be eligible for certification is one year. However, with upgrade training, an operator should be able to advance to higher levels within a reasonable time frame.

F. Conclusion

The Water Quality Control program in the Mississippi Air and Water Pollution Control Commission is currently focusing efforts in the ongoing maintenance of established program, and minimal staff increases or program changes are forecasted unless unforeseen changes occur at the federal level. In cooperation with the Mississippi Water and Pollution Control Association the Commission is involved in a voluntary operator certification program. Changes in status of this program are not anticipated at the present time.

The number of certified wastewater treatment plant operators is expected to increase dramatically within the next five years. Currently all training available to these employees which is of an upgrade nature is offered by the Commission staff, in cooperation with the Association. If the attractiveness

of these jobs improves and salaries increase, greater demand may occur for the availability of institutional operator curricula. At the present time State administrators doubt the practicality of the development of such programs.

VIII. ENERGY

A. Introduction

Mississippi has utilized various sources for its energy supply, but has largely been dependent upon natural gas. In the past three years, increased usage has taken place of heavy oils and gases, and propane and diesel fuels are also utilized to some degree in the State. Mississippi imports approximately 70% of its natural gas, and produces the remainder that it uses. Refineries in the State produce a significant amount of propane, natural gas and other products, and the State exports a major portion of its produced fuel products. There has been an active program to seek the development of a deepwater port, providing luring facilities for carriers, to be developed jointly with the State of Alabama. No decisions have as yet been reached.

No coal production has been taking place in the State, and very little coal consumption, although the usage of coal is increasing. Lignite, a form of coal and a potential source of energy, is found in the State. Some of this "lignite land" has been leased, and the State Legislature has been asked to enact regulations concerning lignite mining activities. A moratorium has been declared on this issue, and it appears that mining will not take place for several years.

Mississippi Power and Light is constructing a two-unit nuclear power plant in the State. The first unit is scheduled to begin operation in 1979 or 1980, and the second unit a year later. In addition, the Tennessee Valley Authority is planning to locate a nuclear facility in northeast Mississippi, although construction has not yet begun. According to State

sources, these efforts have met with very little opposition from the Mississippi public.

Mississippi has typically had few environmental problems resulting from energy production because of its heavy reliance on natural gas. However, curtailments of natural gas have been occurring since 1970, and industries are forced to convert to propane, fuel oils, coal or waste products such as wood chips. Not only has this created storage, transportation and environmental problems, but many industries have been forced to go out of business because of the difficulty in converting caused by facility, equipment and monetary limitations.

Most energy-related research in the State is carried out at Mississippi State University, where researchers are studying the application of solar heating and solar drying to agricultural practices. A test facility of the National Aeronautics and Space Administration, located in Mississippi, has been researching positive ways of utilizing the water hyacinth, a plant that has caused problems in southern states because of its extremely rapid growth. Researchers have dried the plants and are seeking ways of utilizing the remains to produce energy. In addition, it has been found that water hyacinths will absorb heavy metals out of water, and the plants are being experimentally cultivated in sewage lagoons.

B. Workforce Profile

Mississippi's State agency that has chief energy concerns is the Mississippi Fuel and Energy Management Commission. This office is mainly involved in petroleum allocation, and has no direct activity in the area of pollution control, except as environmental regulations impact energy

production activities. Efforts will soon be focused in the area of energy conservation, as this agency will be the recipient of a grant stemming from the Energy Policy and Conservation Act of 1975 (EPCA). The goal of the program that will be carried out, as prescribed by the Act, is a reduction of five percent or more in the total amount of energy consumed in the State in 1980 from the projected energy consumption for that year. All States participating in this program are to develop energy conservation plans that include:

1) Mandatory lighting efficiency standards for public buildings (except public buildings owned or leased by the United States);

2) Programs to promote the availability and use of carpools, vanpools, and public transportation (except that no federal funds will be used to subsidize public transportation);

3) Mandatory standards and policies relating to energy efficiency to govern the procurement practices of such state and its subdivisions;

4) Mandatory thermal efficiency standards and insulation requirements for new and renovated buildings (except buildings owned or leased by the United States); and

5) A traffic law or regulation which, to the maximum extent practicable consistent with safety, permits the operator of a motor vehicle to turn such vehicle right at a red light after stopping.

The Mississippi Fuel and Energy Management Commission has a current staff of two. To implement the provisions of the Act, this staff has decided that task forces and advisory committees will be utilized to a large degree. The first meeting for potential members, which was limited to persons from the Jackson area, was held in November of 1976. Invitations were extended to 42 agencies, firms, and associations, including

producers, sellers, architects, building supply firms, government agencies and utility companies. This meeting was held for the purpose of acquainting the representatives with the requirements of the Act, and to solicit their support. Similar meetings are being held for professionals from other portions of the State. The Commission is concerned that the mandated five measures alone will not be sufficient to meet the goal. Alternatives will be explored with input from the groups that will be formed.

The State Economic Opportunity Office is also concerned with energy conservation. This Office coordinates low-income housing weatherization projects through the allocation of federal funds to 19 Community Action Agencies that serve 44 of the State's 82 counties. These funds stem from the Federal Community Services Administration and were supplemented with Title X funds from the Economic Development Act. Besides weatherization, these agencies pay power bills in cases of emergency, help low-income persons obtain loans from the Farmer's Home Administration for repairing homes or purchasing new homes, and provide counseling and other services relating to fuel and energy problems. How these services are provided is left up to each particular agency, but in nearly every case, the services are performed by the agencies themselves, though often utilizing volunteers from civic groups or other local people. One person in the State Economic Opportunity Office coordinates these projects on a part-time basis. The numbers involved in the local agencies varies, and at times everyone in each agency could be spending full-time in such related work, depending upon the needs.

C. Workforce Projections

The director of the Fuel and Energy Management Commission does not anticipate a need for an increased staffing level, as most duties to be

resulting from EPCA will be accomplished by advisory committees and task forces. The energy coordinator in the State Economic Opportunity Office hopes to add the support of several people for energy-related activities, as the amount of federal funding for these projects may greatly increase. At the local level, this increase in funds will probably cause involvement of a greater number of people, and plans are underway to expand Community Action Agency services to include all 82 counties in the State. As new activities would be focused towards crisis intervention, increasing uses would be required mainly for outreach workers and fiscal officers.

The requirement of EPCA that will cause the greatest workforce impact is number four: mandatory thermal efficiency standards and insulation requirements for new and renovated buildings. This will require highly trained architects, scientists and engineers with skills in building design, product development and efficient heating and cooling techniques.

D. Training and Certification

Training for engineers is carried out by the University of Mississippi and Mississippi State University. The latter university also offers an educational program in architecture. Jackson State University offers a degree in industrial technology. Training for scientists is principally carried out by the four state universities: Mississippi State University, the University of Mississippi, the University of Southern Mississippi and Jackson State University.

Directly relating to energy production, Mississippi State University's College of Engineering offers curricula in nuclear engineering and petroleum engineering.

E. Career Potential

Career opportunities are expected to develop over the next five years for degreed and highly trained engineers, scientists and architects with skills in building design, product development and efficient heating and cooling techniques. Stepped-up energy-related programs may cause increased opportunities in local Community Action Agencies, especially for outreach workers and fiscal-type personnel.

F. Conclusion

Presently, two professionals work in the State's Fuel and Energy Management Commission. This office will coordinate an energy conservation program under the Federal Energy Policy and Conservation Act, and the office does not anticipate that an increased staffing level will be required, as many functions will be carried out by task forces and advisory committees, currently being formed. Workforce impacts of this program are likely to occur in the private sector, however, and opportunities should occur for skilled architects, scientists and engineers to assist in meeting mandatory requirements.

The State Economic Opportunity Office coordinates a weatherization program for low-income citizens, which is implemented through local Community Action Agencies. Anticipated increases in federal funding may cause small workforce increases at the State level, and to a higher degree, at the local level.

Selected Post Secondary Institutions With Formal Environmental Energy Programs

The following pages provide outlines of two environmental curricula, at Mississippi Valley State University in Itta Bena and the University of Southern Mississippi in Hattiesburg. Both programs are geared to producing graduates who are well equipped for environmental employment.

Mississippi Valley State University offers a B.S. degree in Environmental Health which includes coursework relevant to present environmental needs. In addition to studies in applicable sciences, participants concentrate in Occupational, Radiological, Environmental, and Public Health with supportive work in organization and administration.

The University of Southern Mississippi stresses career oriented training in its Environmental Technology program. Students may qualify for a B.A. or B.S. degree in this technological field. Other environmental programs are offered but staffing and enrollment are limited. These include: 1) Environmental Health-Industrial Hygiene Technology Emphasis, 2) Environmental Health-Sanitation Technology Emphasis, and 3) a peripherally related Industrial Technology Curriculum. These additional curricula include coursework in air, water, and noise pollution, solid waste management, improvement projects, industrial hygiene, and several related studies.

Professionals at these institutions and university publications were sources for this information.

SENIOR INSTITUTIONS

Mississippi Valley State University
Itta Bena, Mississippi

Program: Environmental Health (B.S.)

Hours required for major: Semester - 145
Program Inception: 1975
Staff Size: Three instructors (3 M.P.H.s)
Enrollment: 35
Graduates (1976): 5
Placement: 3
Graduate Work: 0

Courses

English Composition
General Biology
General Algebra/Trigonometry
Fine Arts
Introduction to Sociology
General Psychology
General Chemistry
General Physics
World Literature
Invertebrate Zoology
Entomology
Human Physiology
Introduction to Environmental Health
Organic Chemistry
Introduction to Biostatistics
Introduction to Epidemiology
Microbiology
Environmental Health I
Biochemistry
Applied Entomology and Pest Control
Environmental Health II
Public Health Organization and Administration
Occupational Health
Environmental Health Program Planning
Introduction to Radiological Health
Public Health Sanitation
Problems in Environmental Health
Health Education
Speech

SENIOR INSTITUTIONS

University of Southern Mississippi
Hattiesburg, Mississippi

Program: Environmental Technology (B.A., B.S.)

Hours Required for Major; Semester Major 130.
Program Inception: 1970
Staff Size: Two professors (2 Ph.D.s)
Enrollment: 53
Graduates (1976): 9
Placement: 4
Graduate Work (M.S.): 3

Courses

Environmental Problems I, II, III, and IV
Man in His Environment
Environmental Improvement Projects
Environmental Impact Statements
Principles of Environmental Health
Pollution Dectection - Water
Pollution Dectection - Air
Air, Water, and Solid Waste Management
Electronics for Scientists
Principles of Industrial Hygiene
Special Projects

State Legislation

MISSISSIPPI AIR AND WASTE WATER

TITLE:

Air and Water Pollution Control Law
Mississippi Code 49-17-1

PURPOSE:

To preserve the air and waters of the state and to protect, maintain and improve the quality thereof for public use.

DEFINITIONS:

1. Pollution
2. Wastes
3. Sewerage system
4. Treatment works
5. Disposal system
6. Waters of the state
7. Air contaminant
8. Air pollution
9. Air contamination
10. Air contamination source
11. Air-cleaning device
12. Area of the state
13. Commission
14. Person

ADMINISTERING AUTHORITY:

Air and Water Pollution Control Commission
Permit Board

AUTHORIZATIONS:

To act as the state lead agency in air and water pollution matters;
To develop comprehensive air and water pollution control plans;
To issue regulations pursuant to the act;
To administer federal funds;
To conduct air and water studies and investigations;
To establish air and water quality standards;
To control air and water discharges;
To enter and inspect property in enforcement of the act.

PROHIBITED ACTS:

To cause air pollution or reduce air quality;
To discharge air contaminants without permit;
To cause water pollution or reduce water quality;
To construct or modify disposal systems without permit;
To violate the terms of any permit.

PENALTIES:

Fines of from $50 to $5,000;
Liability imposed for wildlife and fish damage and clean-up actions;
Pollutant discharge violations - fines of from $2,500 to $10,000.

MISSISSIPPI PESTICIDES

TITLE:

Pesticide Application Act of 1975
Mississippi Code 69-23-101

PURPOSE:

To provide for the use and application of restricted use pesticides and for the certification of pesticide applicators.

DEFINITIONS:

1. Commissioner
2. Certification
3. Certified applicator
4. Commercial applicator
5. Division
6. EPA
7. FIFRA
8. License
9. Person
10. Pest
11. Pesticide
12. Private applicator
13. Public applicator
14. Restricted use pesticide
15. State restricted use pesticide
16. Under direct supervision of certified applicator
17. Unreasonable adverse effect on environment

ADMINISTERING AUTHORITY:

Department of Agriculture and Commerce
Pesticide Advisory Board

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To establish certification and classification standards;
To certify pesticide applicators;
To generally enforce the act.

CERTIFICATION OR LICENSING:

All private and commercial applicators of restricted use pesticides must be certified; qualifications and competency through examination required.

PROHIBITED ACTS:

To engage in pesticide application unless properly certified;
To apply pesticides in a careless or negligent manner;
To fail to keep required records;
To violate the terms of any certificate.

EXEMPTIONS:

Persons subject to licensing under other pesticide laws.

PENALTIES:

Fines of up to $500 or 6 months imprisonment.

MISSISSIPPI PESTICIDES

TITLE:

Pest Control Law
Mississippi Code 69-19-1

PURPOSE:

To provide for the regulation of persons engaged in professional pest control services.

DEFINITIONS:

1. Entomological work
2. Horticultural and floricultural work
3. Person
4. Plant pathological work
5. Tree surgery work
6. Weed control work

ADMINISTERING AUTHORITY:

Department of Agriculture and Commerce

AUTHORIZATIONS:

To issue regulations regarding persons engaged in pest control work;
To issue licenses to professional service persons;
To protect against fraudulent and unqualified practices.

CERTIFICATION OR LICENSING:

Licenses shall be issued without fee upon showing of qualifications and competency through examination.

PROHIBITED ACTS:

To violate any regulations or provisions of the act.

EXEMPTIONS:

Persons employed and supervised by professional service personnel.

PENALTIES:

Fines of up to $500 or 6 months imprisonment.

MISSISSIPPI POTABLE WATER

TITLE:

Safe Drinking Water Act of 1976
Mississippi Code

PURPOSE:

To maintain and protect the quality of the drinking water of the state.

DEFINITIONS:

1. Agency
2. Director
3. Public water system
4. Person
5. Municipality
6. Federal agency
7. Supplier of water
8. Contaminant
9. Administrator
10. Federal act
11. Primary drinking water regulation
12. National primary drinking water regulations

ADMINISTERING AUTHORITY:

State Board of Health

AUTHORIZATIONS:

To issue regulations regarding treatment methods and drinking water quality;
To supervise and monitor water suppliers;
To issue variances;
To develop a comprehensive drinking water plan;
To act as the state lead agency in drinking water matters;
To generally enforce the act.

EXEMPTIONS:

Solely distribution systems, supplies which don't sell, purchasers from approved supplies.

PROHIBITED ACTS:

To fail to comply with any rule or act provision;
To fail to comply with any orders issued.

PENALTIES:

Fines of up to $5,000;
Willful violation - fines of up to $5,000 per day.

MISSISSIPPI RADIATION

TITLE:

Radiation Protection Act of 1976
Mississippi Code 45-14-1

PURPOSE:

To permit the utilization of radiation sources consistent with public health and to control harmful effects of radiation.

DEFINITIONS:

1. Act
2. Agency
3. Agreement materials
4. Agreement state
5. Atomic energy
6. Board
7. By-product material
8. Commission
9. Council
10. Electronic product
11. Emergency
12. Ionizing radiation
13. License
14. Non-ionizing radiation
15. Nuclear energy
16. Person
17. Radiation
18. Radiation machine
19. Radioactive material
20. Registration
21. Source of radiation
22. Source material
23. Special nuclear material

ADMINISTERING AUTHORITY:

State Board of Health
Radiation Advisory Council

AUTHORIZATIONS:

To administer radiation protection program;
To formulate a comprehensive radiation policy;
To issue regulations pursuant to the act;

AUTHORIZATIONS (Cont'd)

To conduct studies and investigations of radiation control and effects;
To assist nuclear energy development;
To approve construction and alteration plans;
To license persons who use, own, or possess radiation sources;
To enter and inspect property in enforcement of the act;
To enter agreements with state and federal agencies.

PROHIBITED ACTS:

To use, manufacture or possess radioactive material without proper bond;
To use, manufacture or possess radiation source without license.

EXEMPTIONS:

May be granted by regulation for certain uses or users.

PENALTIES:

Fines of from $100 to $500 or 30 days imprisonment.

NRC AGREEMENT STATE: Yes

MISSISSIPPI SOLID WASTE

TITLE:

Solid Waste Disposal Act of 1974
Mississippi Code

PURPOSE:

To provide for the control and disposal of solid waste and solid waste management.

DEFINITIONS:

1. Solid wastes
2. Garbage
3. Ashes
4. Rubbish
5. Open dump
6. Unauthorized dump
7. Sanitary landfill
8. Landfill
9. Hazardous wastes
10. Incinerator
11. Composting or compost plant
12. Health department
13. Agency

ADMINISTERING AUTHORITY:

State Board of Health
Local Governments

AUTHORIZATIONS:

To provide solid waste collection and disposal facilities;
To issue permits for solid waste facilities;
To issue regulations pursuant to the act;
To supervise and ensure sanitary conditions of solid waste disposal.

PROHIBITED ACTS:

To burn garbage, rubbish or hazardous waste;
To operate or use unauthorized dumps;
To dispose of hazardous waste at a general disposal site.

EXEMPTIONS:

Disposal by individual or firm of solid waste on own land.

PENALTIES:

Fines of from $50 to $500.